

A STORY OF SEPARATION

**Exploring systems of household waste
looking for opportunities for regenerative change**

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ABSTRACT

Humanity is creating more products than ever.

Global recycling systems are struggling.

We need to transition to a circular economy.

This is a collaborative exploration of waste management in Oslo. We worked closely with Renovasjonsetaten and Grønt Punkt Norge, to gather expert opinions and insights into existing systems and the problems and challenges that they face. Both actors were interested in utilizing behavioural design methods to 'nudge' users changing user behaviour to improve the amount of materials getting properly sorted for recycling within the existing systems.

We decided to challenge that focus as we found that people were surprisingly content in their role as waste sorters. Most people understood the need and were happy to contribute, but often got confused, frustrated and demotivated when the failings of the system were exposed.

We built our understanding of the system holistically. Through conversations with experts we explored the limitations of the system. Through in-depth interviews with users we were able to map out the home waste system and peoples experiences. Through surveys with different user groups, we explored people's feelings about their role in the system. Through workshops with school pupils, we gauged the understanding and feelings of future users.

Connecting these perspectives we were able to look for high impact leverage points to steer the system in a more desired direction.

Modern consumer culture is intrinsically linked with waste. Packaging is the most visible fraction in most people's lives and one that every society is struggling to deal with. The consequences of struggling systems have entered the public consciousness with media coverage of polluted natural ecosystems and ocean contamination raising awareness of humanity's disconnect from nature. We decided to focus loosely on plastic packaging waste as this is the fraction that is increasingly causing issues worldwide.

“How can we utilise people’s experiences with household waste to increase the percentage of material that returns to a circular material system?”

Waste management is the biggest industry on the planet. Many developed countries have high-tech recycling facilities that deal with waste, but developing countries struggle to invest in expensive solutions we looked for tractable solutions that didn’t rely on expensive investments.

Looking at the material flow as a linear journey we saw a list of hurdles that need to be overcome to allow the system to feedback on itself, the system is far from circular. Products are not being designed to be recycled or sorted for recycling. There is little incentive for producers to design products to fit the existing waste management systems, and consumers have little power to impact the system.

Incorrect sorting behaviour can damage the effectiveness of the system and is bound to occur when products are poorly designed for sorting or recycling. If products are well designed for a circular economy it might happen that the recycling system is unable to process them correctly and that effort is wasted.

We explored a variety of concepts and came up against many limitations that REG and Grønt Punkt were not in a position to deal with, so we looked for ways to improve the situation externally. We chose to explore a concept that utilises people’s altruistic engagement, empowering them to positively impact the systems that generate and manage the waste that they are forced to deal with. We developed a service to unite people, industry leaders and politicians with the goal of creating better and more ecologically designed products.

Our aim is to encourage the creation of circular material systems that are sustainable in the long-term and increasingly go beyond the goal of sustainability (the bare minimum required) and towards regenerative systems that positively impact the environment.

We propose a platform where people and experts can rate the products they use based on experiences, and shared existing knowledge. An opportunity for highly engaged individuals to push for change and utilize their energy and motivation to impact the system for everyone. The platform rates products with different metrics of evaluation producing an overall score for a product which agglomerates to create a score for its brand, parent company and the stores that it can be bought from.

The aim is to encourage the sustainable and regenerative design of products that fit the needs and desires of users as well as the existing waste management system. Designers and producers can showcase innovations, improvements and share insight. Waste management systems can share information about how they process different materials and show which materials are recycled where.

THANKS TO:

Grønt Punkt:

Johannes Daae for his passion and enthusiasm, and for getting us excited about rubbish.

Renovasjonsetaten:

Caja Charlotte Fagernæs, Ellen Thomsen Halaas, Gitte Næss Grønner, John Egil Nilssen, Ragni Maria Skjervold Olsson for sharing their work, and spending time to explain the system and limitations of Renovasjonsetaten.

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All of the other students, friends and strangers that we interviewed and bounced our ideas off.

And Robs mum for checking the spelling.

What a lovely bunch.

PREFACE

Working with a complex theme amid a global pandemic

Working with this project, we have learned about the limits of systems and the complex nature of dealing with them. It has been a challenging time to be working due to the Coronavirus lockdown, but also eye-opening. The problems that humanity is facing and what it is that different societies value has been set in stark contrast. The limits of those in charge to tackle complex issues has been highlighted and it would be wise to not wait around for those in positions of power to solve the complex problems that we are dealing with. What is good for humanity and the planet does not always align with what is good for those that run the systems that we inhabit.

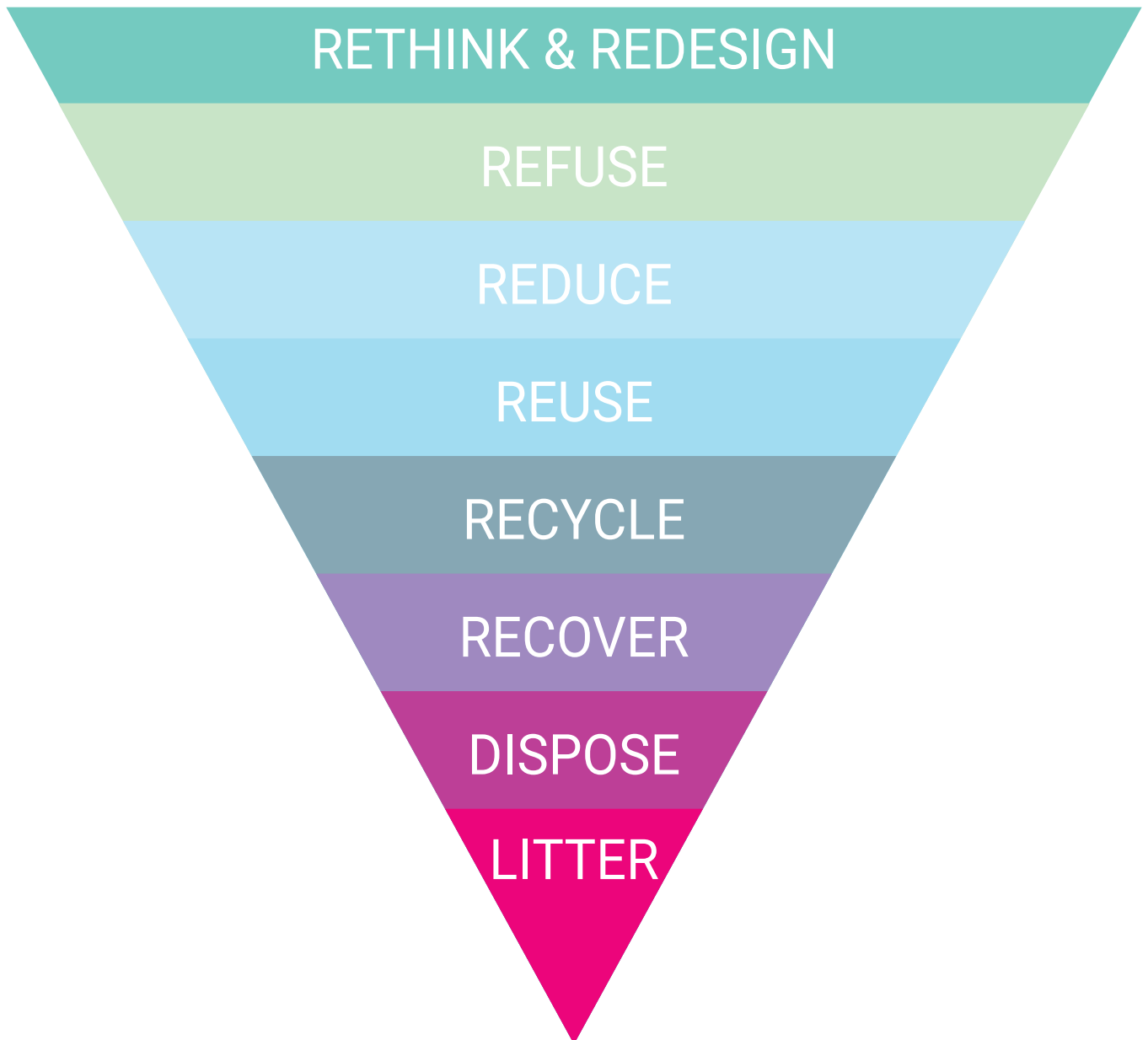
Working digitally as a team was difficult at first, a lot of our work is highly social and based on interviews, throwing ideas off other people and hosting and running meetings and workshops. Fortunately, we had collected a lot of data before the lockdown that we were able to plough through in our isolation and digital tools were in place to facilitate our design process, although there were very real limitations to how well they functioned.

We chose to explore a huge system. Every man-made item eventually becomes waste. We chose to focus household, with an emphasis on plastic waste, always with the user in focus and aimed to empower users to be able to change the situations they find themselves in.

We found that the higher up in the waste hierarchy you work, the more you can impact the system. Dealing with products before they enter the market has significant potential to change behaviour, whereas sorting discarded products out of sight of the consumer barely affects consumer behaviour.

Delaying the hand-in made it difficult to know when to stop. The issue of pollution, waste and unsustainable growth are hot topics and new information is generated constantly. It was hard to decide which new developments were relevant to include in the project and what would be too much.

Working with producers rather than struggling against them makes it easier to align the goals of producer, consumer and the waste system.



The waste heirarchy. The higher up you work the more you impact the system. The aim is to keep materials from being burned, dumped or ending up in nature.

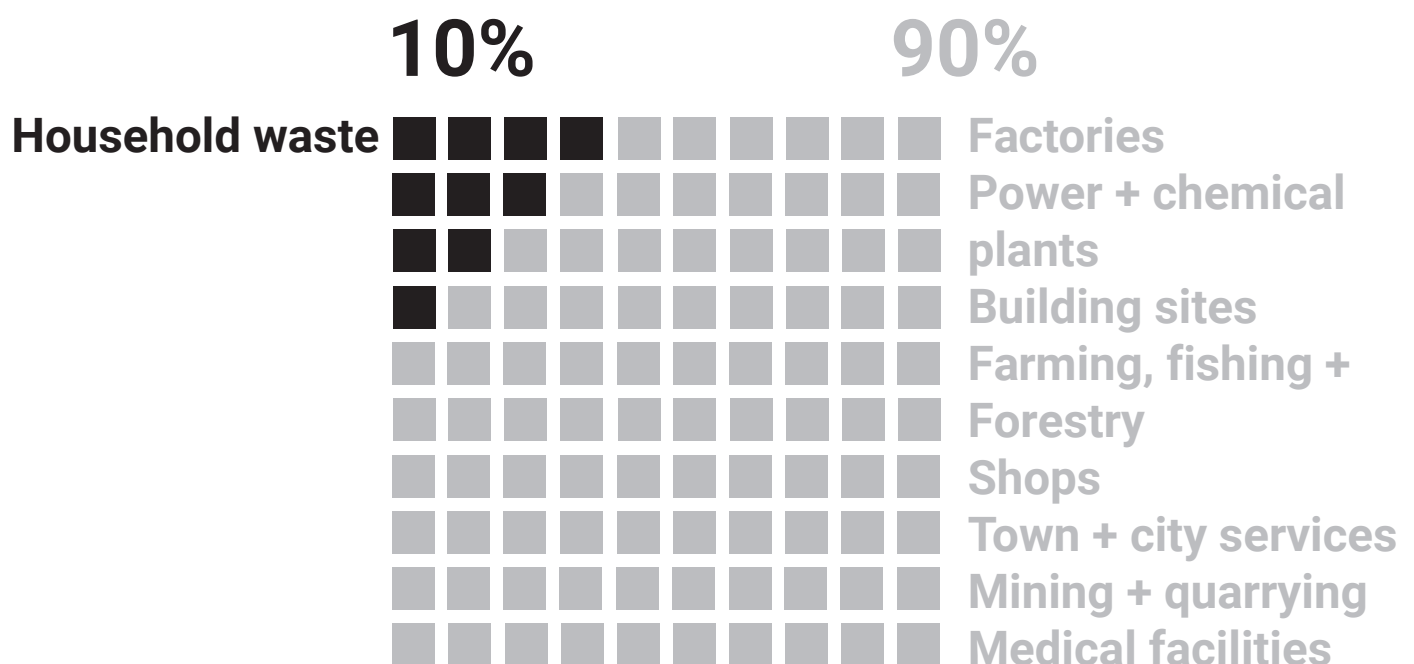
INTRODUCTION

Johannes Daae, a professor at OsloMet and Employee of Grønt Punkt Norge, approached us to take on this project.

REG and Grønt Punkt were both interested in helping people to become better sorters of their waste.

We chose to try to focus the project on plastic waste due to the scale of the project, but were forced to take other materials into account. Plastic recycling is the area that Oslo struggled the most with and has been our focus when looking at the system, although we were forced to touch on other materials throughout the project, due to the interconnected nature of the system.

We set about to map waste sorting experience in the home collaboratively with the inhabitants that use it and experts that work behind the scenes. We explored the recycling system and peoples experiences of it from different perspectives, explored how it can be changed for the better at different levels and explored the limiting factors that stifle this change.



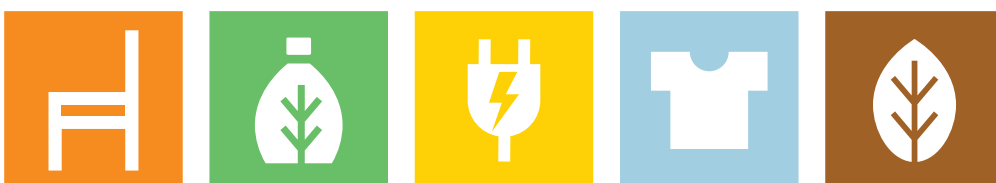
Goods

Goods by Heydays is a design agency that worked on recycling symbols to place on products to help users to sort them more efficiently into the correct bins. The system is based on a Danish one, aiming to create a unified labelling system in the Nordics. We were inspired by these symbols when we saw them as a concept at a conference and used them throughout the project, designing our own inspired by them to represent bioplastic, compostable and electrical goods. A more complete list is available now and is being used in an app by Sortere.no teaching people where to throw their rubbish.

Inspired by these original labels from Goods:



We designed our own for other materials:



**There are shockingly few products in the average Norwegian supermarket that are made from recycled plastic.
Virgin plastic is cheaper and cleaner.**



Made of 100% recycled material

Interestingly there is no symbol that represents that a product is made of recycled materials. This as our attempt to sketch out what that could look like. It's not perfect but there is a need to convey this information so that those that want to support recycled proucts can find them in shops.

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1.0 RESEARCH

How can we influence people's experiences with household waste to increase the percentage of material that returns to a circular material system?

1.1 - THE ACTORS

1.2 - FINDINGS

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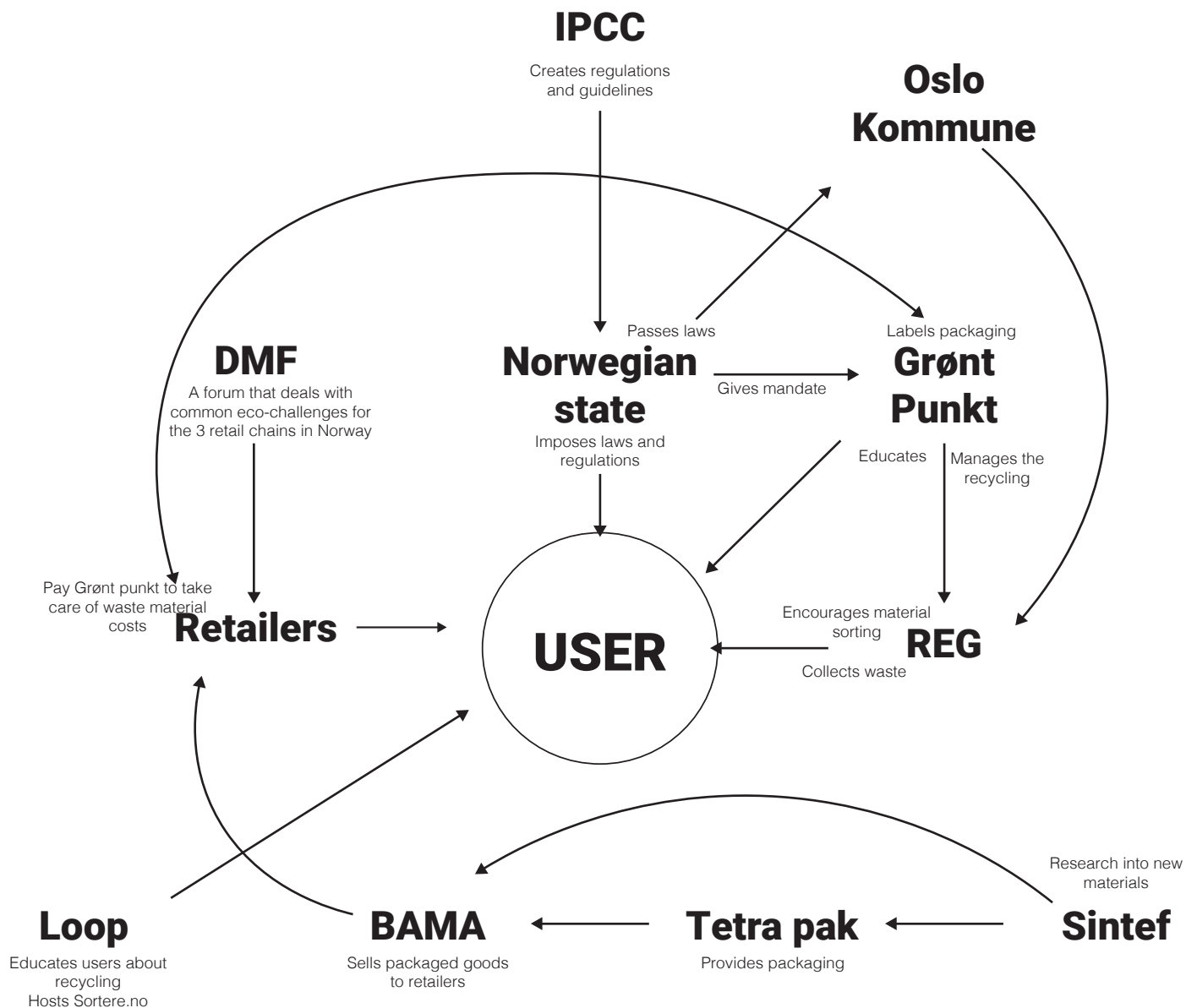
1.4 - BACKGROUND

1.5 - MOTIVATIONS

1.6 - PROJECT TIMELINE

1.1 - THE ACTORS

Recycling is the biggest industry in the world. It is an incredibly complex enterprise, needing to accommodate a legacy of complicated and ever-changing products and materials.





Oslo

Renovasjonsetaten

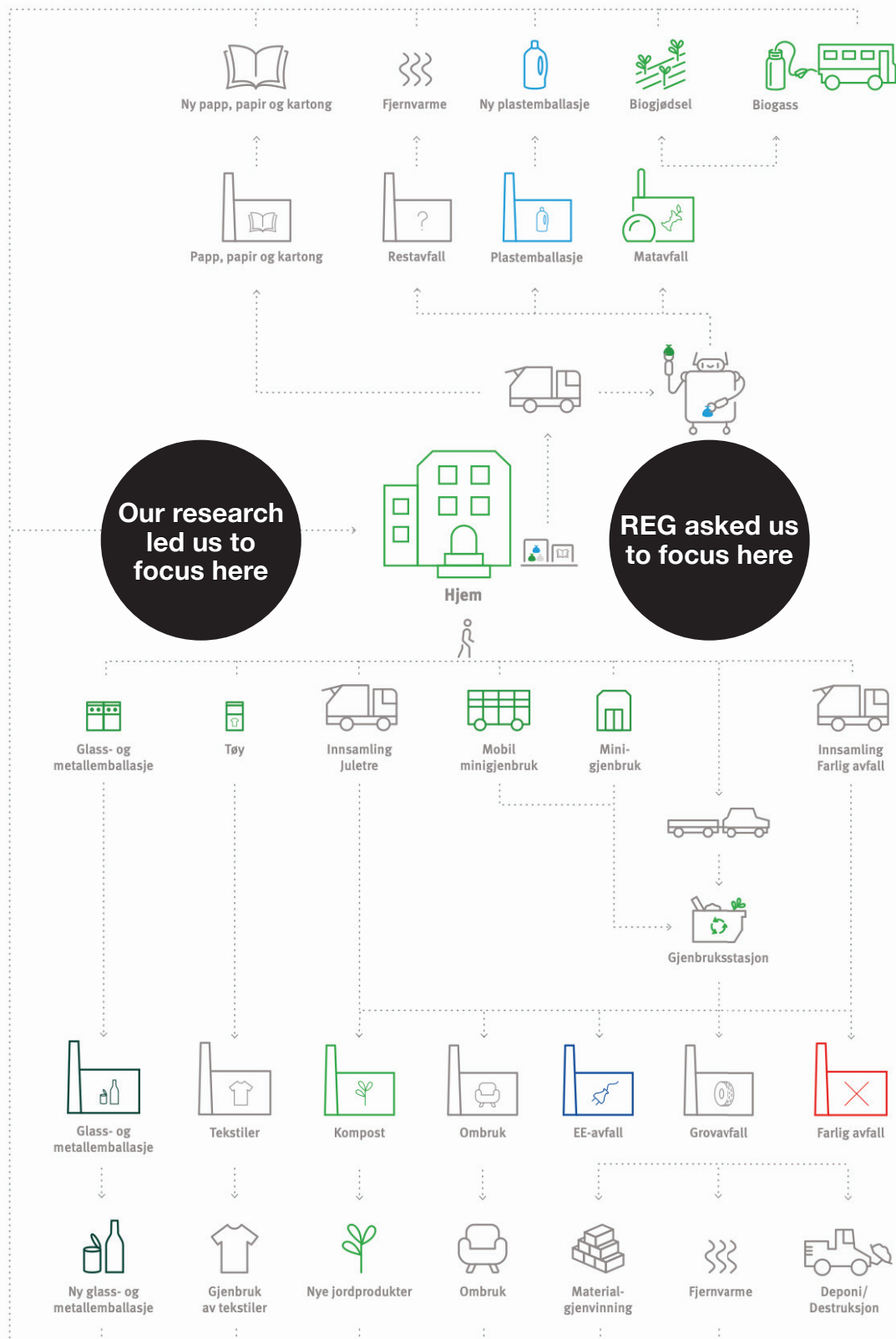
Renovasjons- og gjenvinningsetaten will be referred to as REG for the remainder of the report. REG is Oslo's material recovery facility (MRF, referred to in the industry as merfs, also referred to as waste management systems in this report) responsible for the collection of household waste with the intention of returning as much material as possible back to the production system. Recycling is a concept deeply ingrained in the sustainable systems of a circular economy, but REN is struggling to deliver on recycling goals. This is due to the structure of the agency.

In an interview with REG it was noted that their priorities are, in order of importance:

- 1. Collecting waste**
- 2. Keep the costs down**
- 3. Sort the waste for recycling**

The current home recycling system is mandatory, meaning that in theory, not sorting waste materials could result in punishment, currently there are no consequences for 'opting out' of the system in Oslo. People choosing not to participate in recycling damage the effectiveness of the system since the entirety of its success is dependent on people sorting materials in the home.

One benefit of the current system is that you can utilize the entire populace to aid in the sorting process, their feedback could also be utilised in order to improve the system, this 'user power' is something that we explore in our final concept.



Circular waste management of household waste in Oslo. (Oslo Kommune, 2016)



Grønt Punkt Norge

The Grønt punkt logo on a products does not mean that it is recyclable, merely that the producer has contributed to the disposal costs of the product.

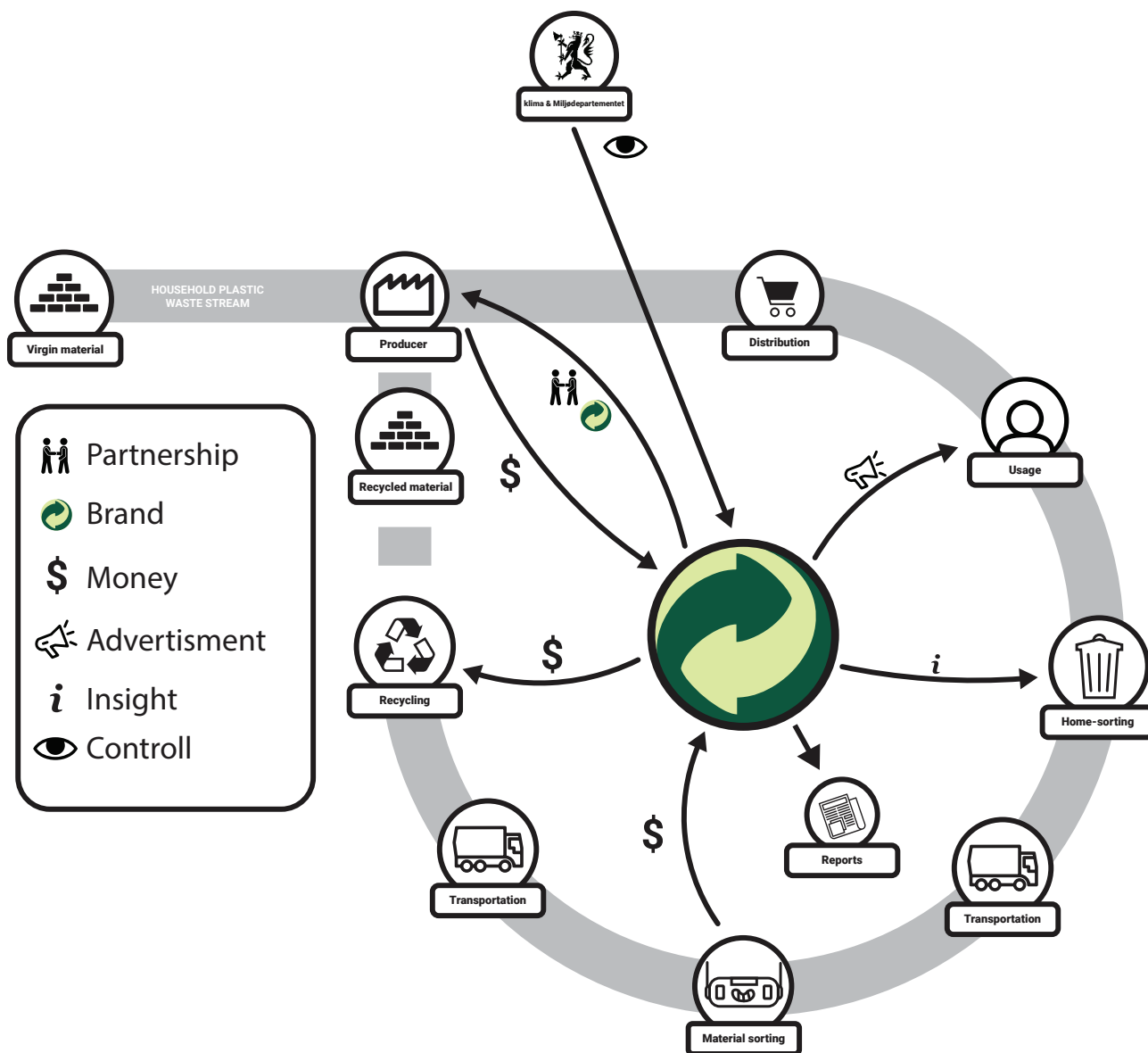
The logo can be placed on products that it would be impossible to recycle.

Grønt Punkt (Referred to as GP throughout the report) is a not-for-profit organization that aims to facilitate the recycling of packaging material that producers put into the Norwegian market. Every company that uses more than 1000Kg of plastic packaging per year must be a member of a packaging waste management company. Companies pay them to cover the costs of their packaging materials being collected. Products paid for in this way may put a GP logo, pictured above, on their packaging (Grønt punkt norge, undated).

After plastic waste has been sorted, it is transported to another facility, either in Stavanger or outside of Norway, to be turned into new pellets. This part of the process is partly hidden from GP, so they cannot accurately report how much plastic waste is being recycled, or who it is sold to, although they are working on getting more feedback from their partners.

GP is owned by the sorting and recycling organizations and managed by a board of representatives from within the industry. The department of environmental protection (Miljøverndirektoratet) monitors GP as a security measure. There is a potential conflict of interests as the company is beholden to a board made up of representatives from various companies that sell a lot of packaged products. GP had a monopoly on this market until fairly recently, competition with Norsirk has been blamed for weakening their ability to put pressure on producers, you could however ask why they didn't put this pressure on earlier.

GP also host The Plastic Promise (Plastløftet) which is a volunteer “call to action” for their members to contribute to a circular economy for plastic. Each member reports on measures made and their results, attending three forums to share progress. This engagement aims to foster transparency and drive innovation, motivating companies to share their progress and their results in a yearly report. The data is unfortunately anonymous and kept internally by the company, so you can't see how well a company is performing (Grønt Punkt Norge, (Undated), 1).



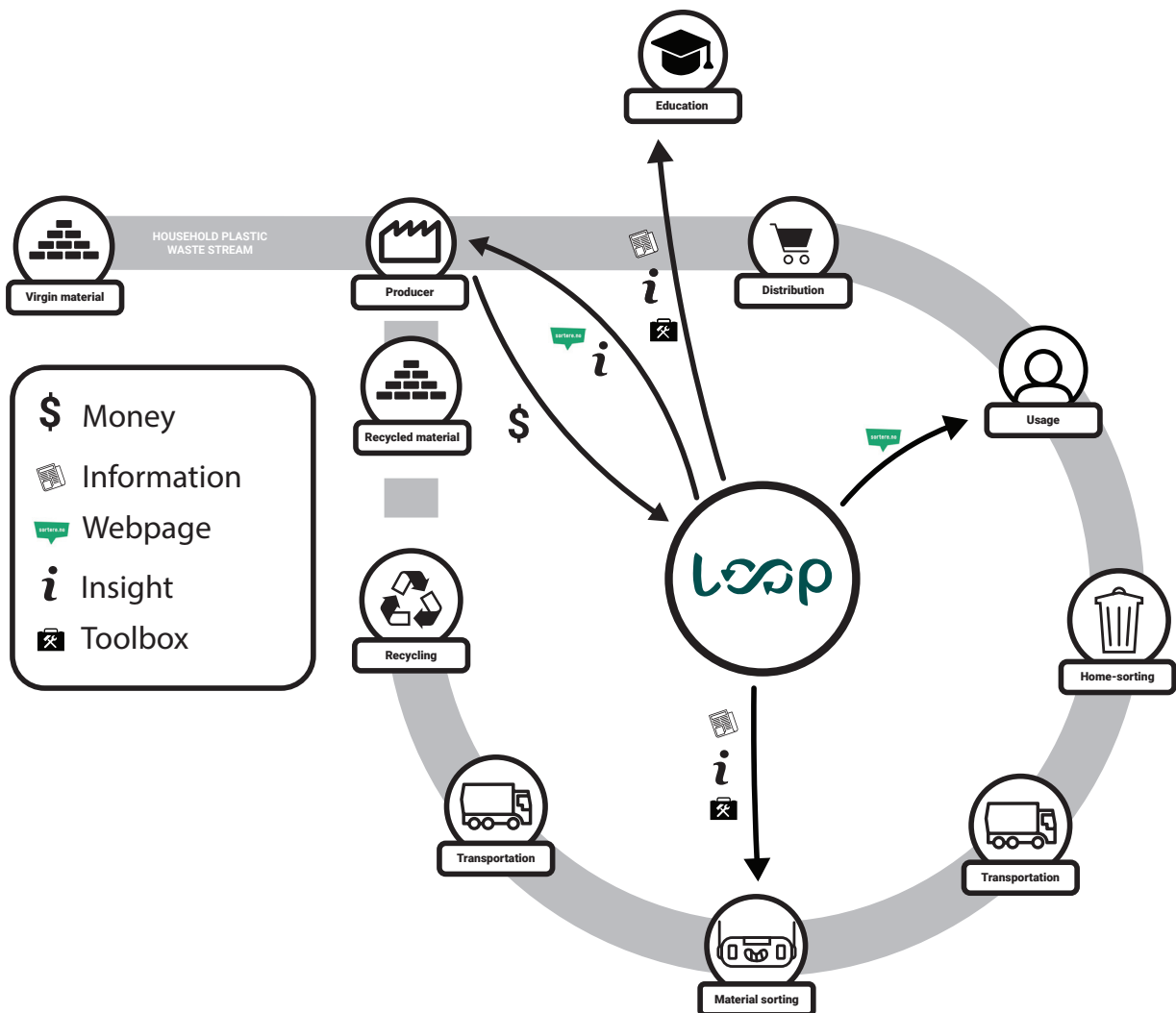
Grønt Punkt's position in Norway's 'circular' economy.

The system is not transparent. Grønt punkt does not share where materials go for recycling, nor how much ends up becoming recycled materials. There is no mandate for transparency.

Loop

Loop is a non-profit organisation that works with communicating better recycling practices to municipalities, companies and people. They are a link between the decisions made by Municipalities and companies collaborating across county boundaries (Interkommunal Selskaper, or IKS) on how people should sort their waste. LOOP is financed through contributions from both private and governmental organisations (LOOP Årsraport 2018, 2018).

LOOP is attempting to raise awareness and knowledge about material recovery by offering courses for schools & kindergartens and by making information easily accessible. Their environmental school (Miljøskolen) is a bundled offer to schools or organisations, a pre-made educational kit that is fitted to the desired learning outcomes. Sortere.no is their platform explaining how items should be sorted for people and companies. Loop works with Municipalities and IKS's to keep the information relevant. Our final concept meshes well with the information available on Sortere.no.

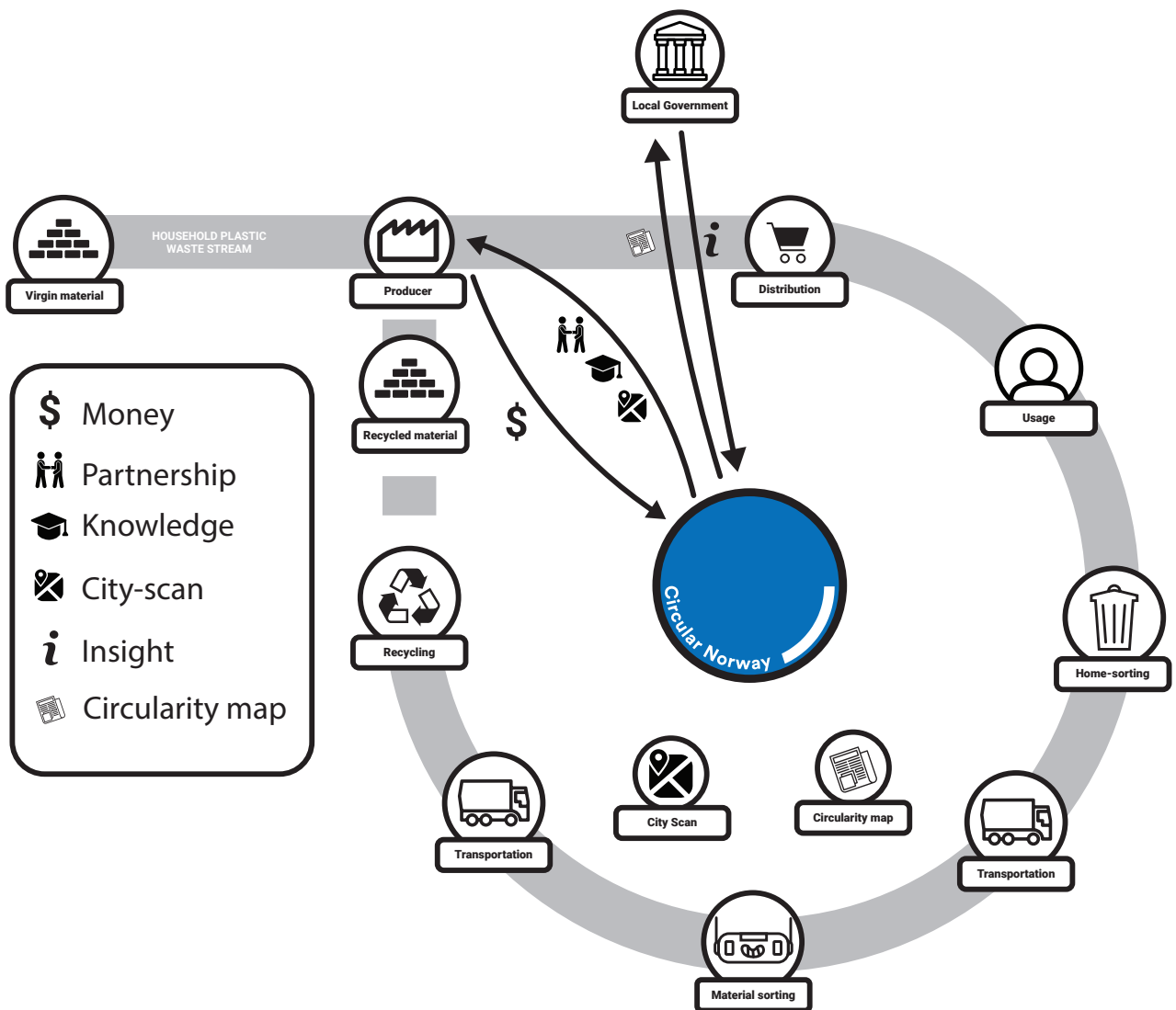


Loop's position in Norway's 'circular' economy.

Circular Norway

Circular Norway is a politically independent organisation. Their goal is to facilitate more circular business models on the Norwegian and Nordic markets.

Circular Norway offers leadership programs to the leaders of partnered or member companies. They have a platform that works to uncover and build circular business models called City Scan. They are also working on a Circularity Gap-report for Norway, this report will show how circular Norway is and what drivers and barriers exist to creating more circular systems.



Circular Norway's position in Norway's 'circular' economy

1.2 - FINDINGS

The Green dot logo on an item does not mean that it is recyclable.

In a linkedin learning video Scott Boylston describes the three types of certificated that a company can award (Boylston, Scott, 2020).

GP's 'Plastløftet' awards 1st party certificates that are internal in a organisation allowing the company to hold themselves to standards that they themselves have chosen.

The GP logo could be considered a 2nd party certificate as it is awarded by industry lobbying groups, which are motivated by increasing that industry or companies growth.

3rd party certificates are awarded by more neutral outsider organisations, like the forest stewardship organisation or the ethical bank guide. We found this kind of award the most interesting for our project, as it holds a level of neutrality that fosters trust in a way that the other two types struggle to achieve.

The KLD (the environmental protection department) controls Grønt Punkt, but the packaging companies run it, this weakens their ability to push for policies that would negatively impact those companies as they are beholden to the industry that they are supposed to regulate and improve. In essence, you have an organisation that manages the recycling, controlled by the industry that it needs to put pressure on to create a better functioning recycling system.

NorSirk has entered the market, creating competition in what was previously a monopoly for GP. NorSirk has already implemented an EPS return system, something Green Dot never did in its 20+ years of market monopoly.

Our project led us to explore a possible next stage in this system for collecting feedback and experiences from consumers and experts in order to encourage accountability and innovation in the design of packaging solutions. We want to change the focus from pressuring people to attempt to recycle whatever 'impossible to recycle' products are thrown at them by lazy producers, to one that encourages and rewards smart designs that function as well as possible in the existing waste management system.

1.3 - EXPECTATIONS

REG and Grønt Punkt are both interested in nudging the users into becoming better material sorters within the existing framework of the waste management system. We set out to question this choice of focus by exploring the system and peoples experiences. We hypothesised that focussing further up the material journey, and nudging behaviour at the production phase could have a more significant impact than focussing on altering peoples behaviour at disposal.

The focus has been on getting as many people as possible to recycle, now with increasing demands for higher quality, uncontaminated material from recycling facilities we imagined that the focus will shift towards collecting the purest possible recycled materials.

REG's system in Oslo has already been surpassed in efficiency by more modern alternatives elsewhere in Norway (ROAF and IVAR, explored later) unfortunately due to the sunk costs invested in the system it is hard to justify replacing it until its performance is deemed to have become unacceptably poor.

Sustainability is the bare minimum that any system needs to achieve in order to survive. A more aspirational goal would be to aim for regenerative systems, mirroring the way that nature functions, where waste from one industry becomes nutrients for another in a positive feedback loop. The high-tech waste sorting solutions currently being tested in Norway are unlikely to scale as a global solution to the waste crisis. Complex, expensive solutions might work in the developed world but are difficult to repeat in less affluent economies that are unable to invest to much in waste infrastructure.

We looked for ways to promote sustainable and eventually regenerative behaviour in the handling of waste and solutions that could scale up to have a more significant impact than only impacting the waste system in Oslo.

1.4 - BACKGROUND

So what's going in the average bin in Oslo?

The average person throws away 170.6 kg of waste per year. Most of this is packaging. Of this waste roughly 16.2 kg is recyclable plastic. Plastic weighs very little compared to its volume, food waste is heavy by comparison.

The average bin contains, by weight:

23.4% Green bags for food waste,

4.3% Blue bags for plastic packaging,

72.3% Mixed waste for energy recovery, normally sorted in shopping bags.

Where's does the plastic end up?

Plastic ends up in all of the collected fractions:

1.2% In green bags,

32.4% Correctly sorted into blue bags,

66.4% In the mixed waste bags.

What else is in the blue bag?

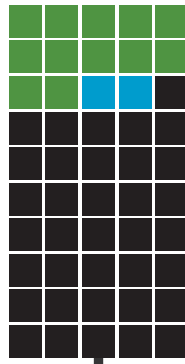
Inside the blue bags we find that only 75.6% is correctly sorted. *The bags themselves constitute 4.5% of this fraction and whilst technically correctly sorted, cannot be recycled into new material, due to high levels of blue pigment needed for the scanning and sorting of bags. REG is experimenting with clear plastic bags with coloured polkadots.




The remaining 24.3% is material that should not be in the blue bag, for a number of reasons (It could be that some households use the free blue bags for mixed waste rather than paying for bin bags).

Of this correctly sorted plastic waste not all of it will be able to be recycled into new material, due to contamination. This led to REG being dropped by GP in March 2020, meaning that no sorted plastic was being recycled in Oslo during the summer (NTB, 2020)

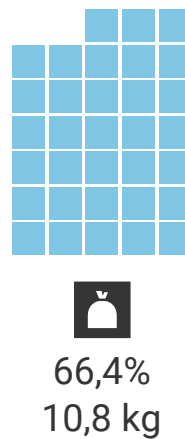
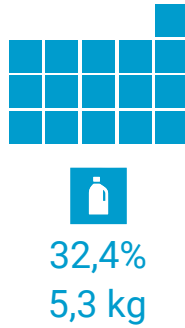
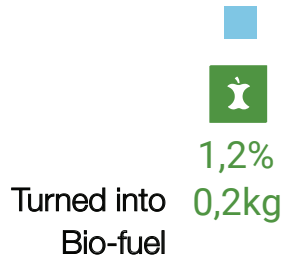
THE AVERAGE BIN IN OSLO

Percentage of materials by weight

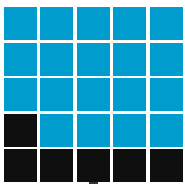


-  Food
-  Plastic
-  Mixed

Where plastic ends up being sorted

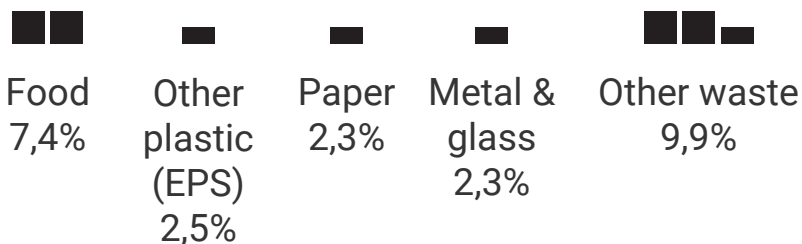


Contents of the blue bags

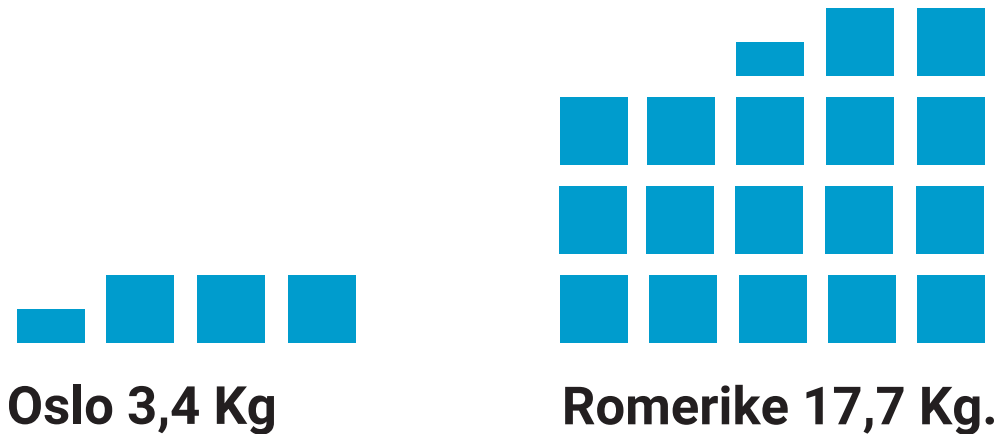


71,1 % + 4,5 %*
Correctly sorted

24%
incorrectly sorted



Plastic waste collected per citizen.



Oslo currently has the worst results for recycling in all of Norway, and this can lead to negative feedback loops in a fragile system that relies on good behaviour from its participants. If people feel that it is not worth the effort to sort their recycling, then they can become be less engaged, and the statistics will worsen. The articles, messages and opinions that inform people about the waste management system do not have to be true. If people believe the narrative and it changes their behaviour, it can damage the system.

The entire weight of the system currently lies on the shoulders of the very people it intends to help.

Experiences

From our interviews, it is apparent that most people are happy to recycle, as the benefits of the small amount of energy expelled in the process are easy to understand and the cost in time and energy is minimal. Frustration arises when that effort feels wasted.

When seeing others sabotaging the system

When confused about what to place where

When finding out the correct sorting method, and discovering that their previous behaviour had inadvertently undermined the system

Currently, an enthusiastic individual highly motivated to do the right thing could spend hundreds of hours researching where different packaging should be disposed of and have all of their time and effort destroyed by a neighbour in a hurry that forgot to take the pizza out of the cardboard box and threw away a plastic bottle filled with oil.

Sabotage



Confusion

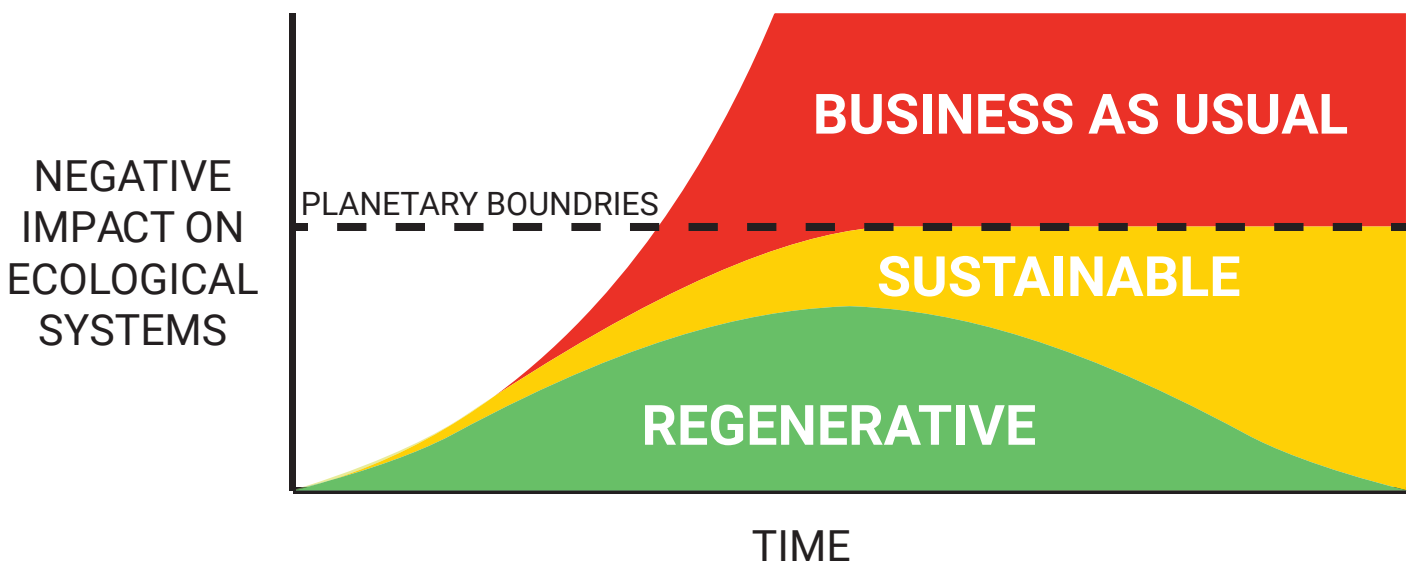


Frustration



We want to promote systems of living that aren't just sustainable, but beneficial.

We want a world where doing the right thing isn't a personal sacrifice, but the best option. Where those that make the right choice, help make it easier for others to do the same

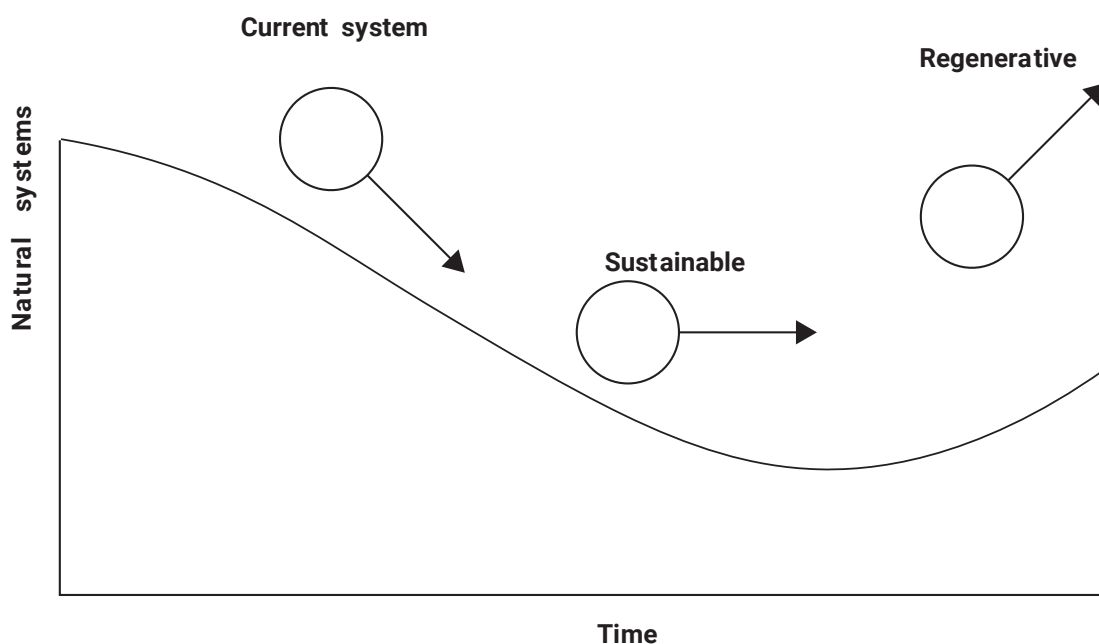


1.5 - MOTIVATIONS

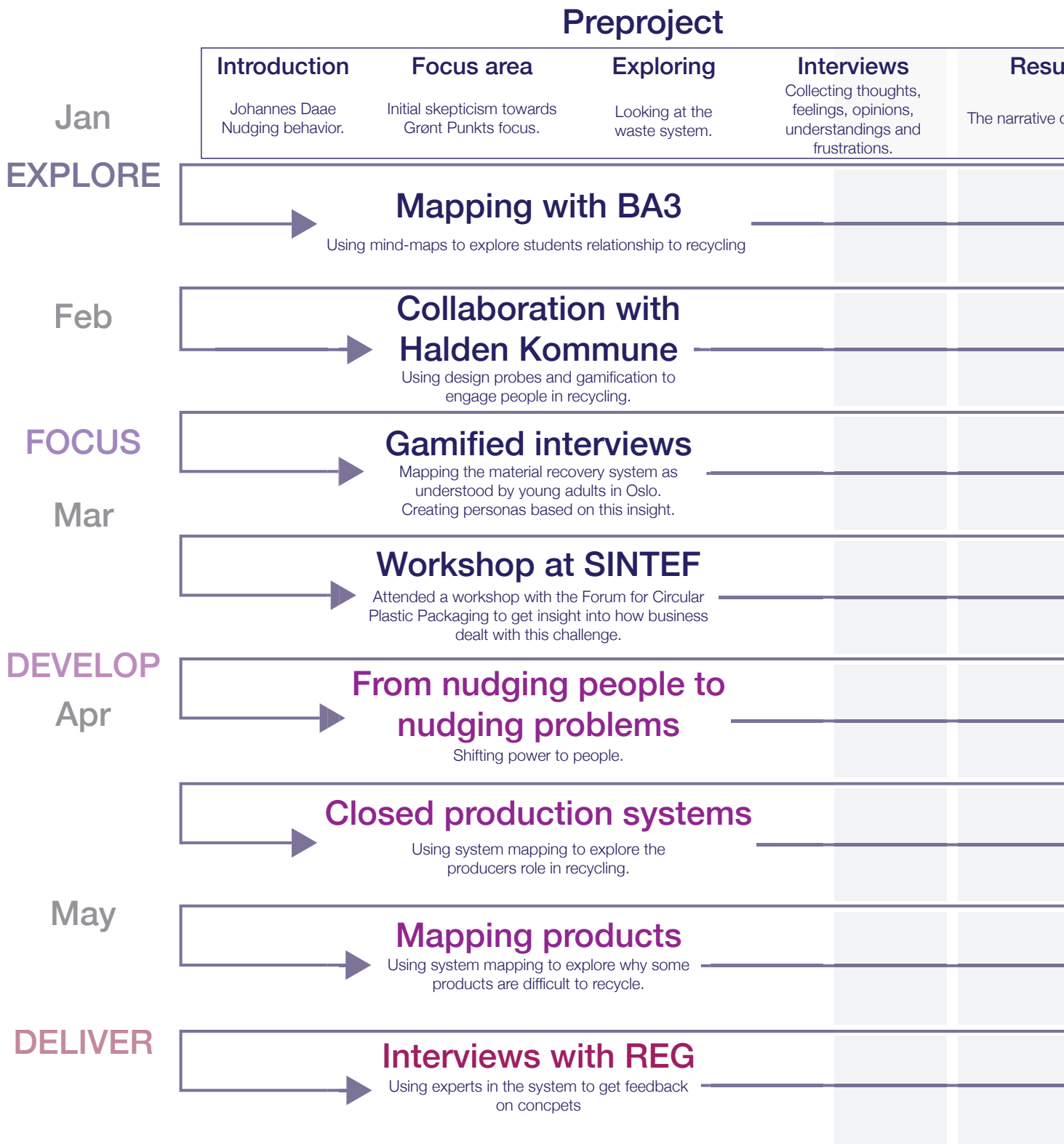
Working with recycling aligned well with our desire to use our knowledge and skills as designers to have a positive impact on the world.

We both have a shared interest in exploring the possibilities of sustainable and then regenerative design. We have an interest in the ethical use of behavioural design methods and enjoy utilising systems-oriented design tools to aid in understanding complex systems.

We believe that design is a crucial tool in meeting and solving the many challenges that humanity is currently facing and will increasingly face in the future. Realising a sustainable and then regenerative circular economy would help mitigate the negative impacts that humanity has had on the planet and it's interconnected ecosystems.



1.6 - PROJECT



TIMELINE

2020



It
of waste.

Masters begins

Desktop Research

Using the themes from mapping to explore theory.

Gamified interviews

Mapping the material recovery system as understood by young adults in Oslo.

Li middle-school workshop

Collaboration with students from 1MA Workshop to map middle-school pupils relationship with the waste recovery system.

Online survey

Exploring the role of the consumer and job satisfaction vs responsibility in different social groups.

Mapping the system

Working with system thinking and mapping the leverage points.

Mapping hurdles

Using visual mapping to explore the hurdles of recycling plastic and how they might be connected.

Concept development

looking at different perspectives to find the most effective leverage point.

Regenerative

A feedback platform for ranking products based on reviews from experts and lay people.

**Covid-19
Chaos
Delayed
hand-in**

2.0 - CONTEXT

2.1 - CLIMATE

2.2 - LEGACY

2.3 - NORWAY

2.4 - CIRCULARITY

“The point here is not that emissions don’t matter. It is a call for a shift in priorities. On the policy level, we need to shift toward protecting and healing ecosystems on every level, especially the local. On a cultural level, we need to reintegrate human life with the rest of life, and bring ecological principles to bear on social healing. On the level of strategy and thought, we need to shift the narrative toward life, love, place, and participation. Even if we abandoned the emissions narrative, if we do these things emissions will surely fall as well.”

(Eisenstein, Charles, 2018)

2.1 - CLIMATE

More than just reducing greenhouse gas levels

There is an intrinsic link between waste management and climate change. Recycling reduces the amount of energy used in the extraction of virgin materials, and reduces the volume of material extraction and disposal that damages ecosystems.

Much of the rhetoric around climate change reduces the issue to a simple mathematical problem of reducing the volume of greenhouse gasses we produce. Project drawdown (Hawken, 2017) attempts to categorise different solutions to climate change based on their potential to reduce CO2 levels. Seven of the top one hundred solutions are linked to the waste management system (See Appendix 9.1).

The narrow-sighted focus on reducing CO2 emissions can lead to a disconnection from human impacts on natural systems. Humanity tends to mentally separate itself from nature, things are either natural or human-made, this is a category error. Everything that is made by man is intimately enmeshed in natural systems.

We explored the waste management system with the awareness of our increasing separation from natural systems. People don't tend to think about their waste once it enters the bin, out of sight and mind. Design activism can utilise images of garbage ruining once beautiful ecosystems and entering the world's oceans to stimulate people to demand change.

Mature natural ecosystems eventually reach a balance where every material has a use. There is very little waste or inefficiency in the natural world where one organisms packaging eventually becomes nutrients for another.

2.2 - LEGACY

"The total amount of resins and fibers manufactured from 1950 through 2015 is 7800 Mt. Half of this — 3900 Mt—was produced in just the past 13 years." (Geyer, J. 2017).

For most of human existence, waste was something that was dealt with locally, the cost of transportation meant that it stayed on the periphery of society, never quite out of sight or mind.

In Norway a thousand years ago, the Viking civilisation left behind a legacy of metal, glass and ceramics objects, the majority of their possessions and infrastructure (transport, housing, clothing, packaging, and utensils) returning to natural systems.

Until the 1970's much of our waste was still organic or reusable materials (Cardboard, paper, fabric, glass and metal) and most waste was sent to landfill. Plastic exploded onto the market together with a massive increase in population and consumerism. Since then, our products have become increasingly complex.

We are living in a paradigm shift in the way that society deals with waste. More than half of the plastic currently in circulation was made in the last thirteen years and only around 9% of all the plastic ever produced has been collected for recycling (Geyer, J. 2017). Household recycling was implemented in Oslo in 2010.

What will our legacy be in a thousand years?

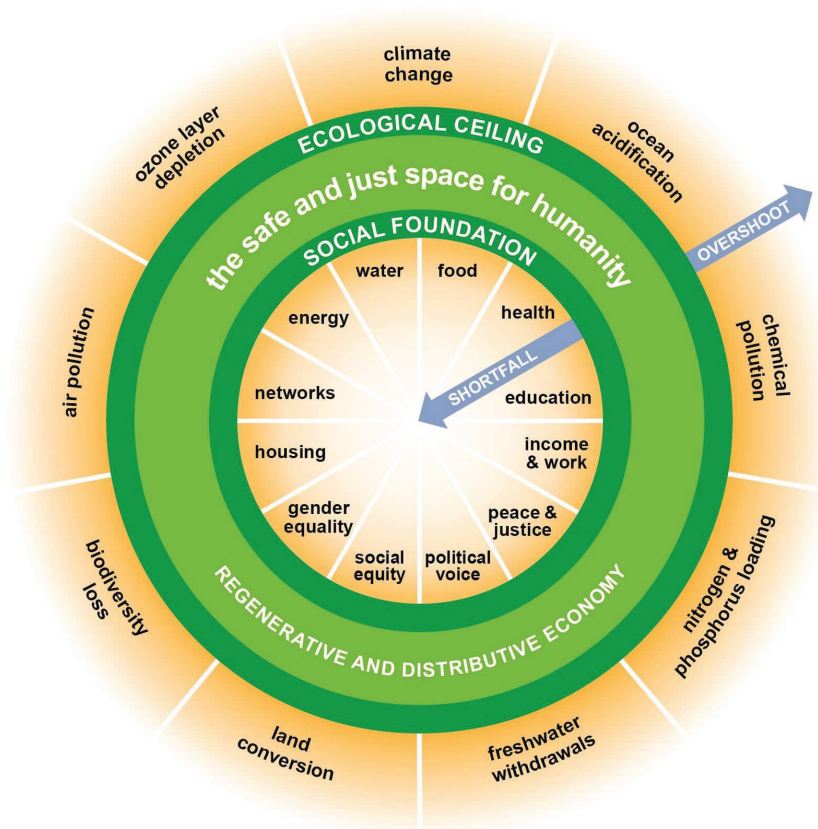
How much of our waste will return to natural cycles?

How much will be the burden of our descendants?

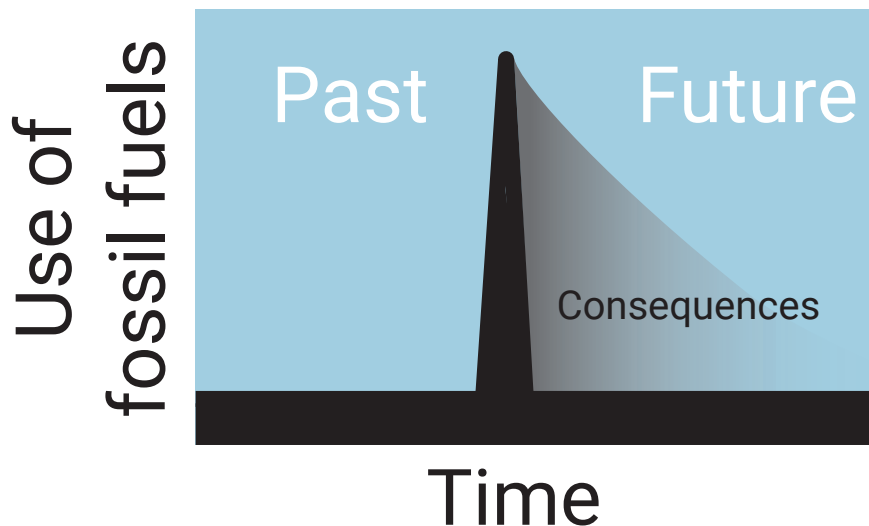
Human activity is beginning to bump into some of the limitations that are inevitable when inhabiting a closed system planet consisting of finite sources and sinks.

In the 1970s the club of Rome wrote *The Limits to Growth* (Meadows, Randers et al. 2004) where they simulated how long we could continue at current rates of resource extraction, habitat destruction, and pollution of shared systems before we hit the limits of what the earth can sustain.

More recently, Kate Raworth has introduced the model of doughnut economics, presenting the environmental and social limitations that society exists within as a habitable doughnut where overshoot in any area will have negative consequences (Raworth, 2017). When looking at the challenges that humanity is facing waste management may not seem like the most pressing issue to focus on, but it plays a critical role in that shift.



The sustainable Doughnut (Raworth, 2017)



**Fossil fuel use in a historical context (Hopkins, 2008).
We do not currently understand the full extent of the
legacy that our use of fossil fuels will leave.**

"Without urgent action, global waste will increase by 70 percent on current levels by 2050" - World Bank (Kaza, S. et al, 2018)

In January 2018 China implemented 'Operation National Sword' which planned to reduce imports of waste ramping up to a total ban of imported materials by 2020 (Trufelman, 2019). China had previously imported the majority of the world's waste materials for use in its manufacturing industry. This change impacted the entire global waste system, as the majority of the western world had neglected investments in their own waste systems.

The policy resulted in poorer countries, often suffering from corruption in leadership, accepting waste without having the infrastructure in place to deal with it properly. The amount of waste finding its way into natural systems has dramatically increased and has entered the public consciousness in the dramatic images of plastic in the oceans. Most of this plastic comes from 10 rivers.

It is predicted that by 2050 if trends continue as they currently are, there will be more plastic than fish in the world's oceans (World Economic Forum, 2016).

2.3 - NORWAY

A fossil fuel economy

In 2052, the follow up to the limits to Growth, Jorgen Randers described the current global paradigm as *"happiness via continued economic growth based on fossil fuels."* (Randers, 2012)

With the increasing global environmental awareness, people have grown to see the oil industry as the 'bad guys' in the ecological debate. Based on our interviews, the relationship to the fossil fuel industry in Norway is more complicated.

When Norway discovered oil reserves in the 1970s, they nationalised the oil industry with benefits shared throughout society, and profits saved for the future. The Government Pension Fund of Norway is the largest sovereign wealth fund in the world. The Norwegian oil industry has also earned a reputation for extracting resources responsibly compared to many other actors in the industry.

Most Norwegians are well aware of how much the oil industry has benefited them and have at least some understanding of the role the industry has had in enabling their current standard of living.

There is also a level of separation from the negative consequences that the fossil fuel economy creates. Since Norway has a strong wind and hydroelectric clean energy system, 90% of the energy produced in Norway is renewable, (Energifaktanorge, 2019), it can use clean energy at home and sell the majority of its oil to other countries (Norsketroleum, 2020), using the profits to fuel its shift to more sustainable systems.

With oil being the biggest industry in Norway, responsible for a large portion of the GDP, as well as the production of plastic, there is a conflict of interest for Norway, at a government level, to commit to decreasing production of plastic items.

How do you design around this?

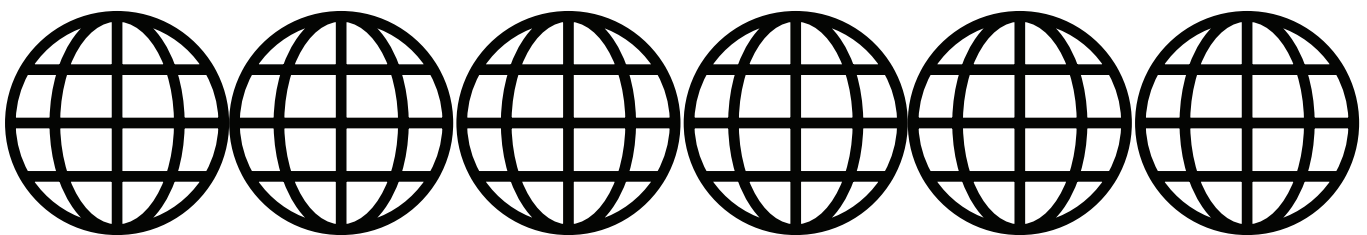
It's cheaper to burn plastic than recycle it.

In Norway burning waste for energy is technically counted as recycling. There is no difference when it comes to companies receiving their miljøavgift.

If the entire world consumed as much as Norway, we would need six planets to sustain our standard of living. As a planet we are currently on track to consuming three worlds worth of resources by 2050. In the coming years, we expect to see a doubling of raw material consumption and an increase of 70% by 2050 (European Commission, 2020).

There is increasing push by governments and intergovernmental organisations to encourage sustainable practices. Much of this encouragement can seem toothless without incentives to improve behaviour or negative consequences for not delivering on expectations or promises.

It is easy for a company to receive praise and positive publicity by proclaiming grand visions and plans for more sustainable behaviour in the future. There are rarely any systems to hold companies accountable for promises not met, and it is easy to make a new promise. The problem is visible in politics too where announcements of grand plans can be made safe in the knowledge that it will be the next government's responsibility to carry them off.



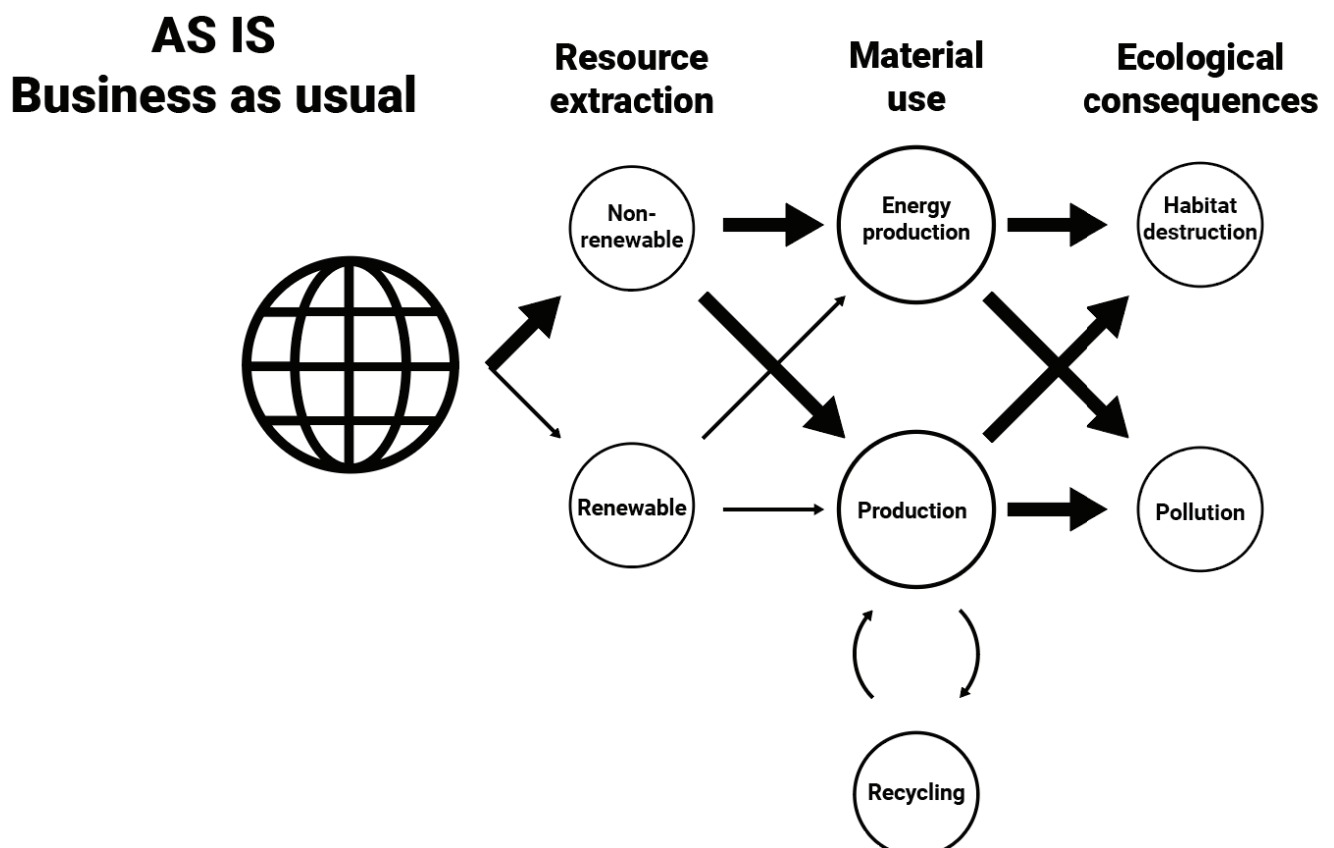
How do we hold companies accountable for their lofty promises and shine a light on greenwashing?

2.4 - CIRCULARITY

The European Commission's report accompanies their new directive intended to support the development of circular economies in the European Union and EØS countries.

The directive makes companies legally obligated to make all of the individual components and the resultant final product recyclable. The report ranks different categories in order of importance, placing packaging 3rd and plastic 4th.

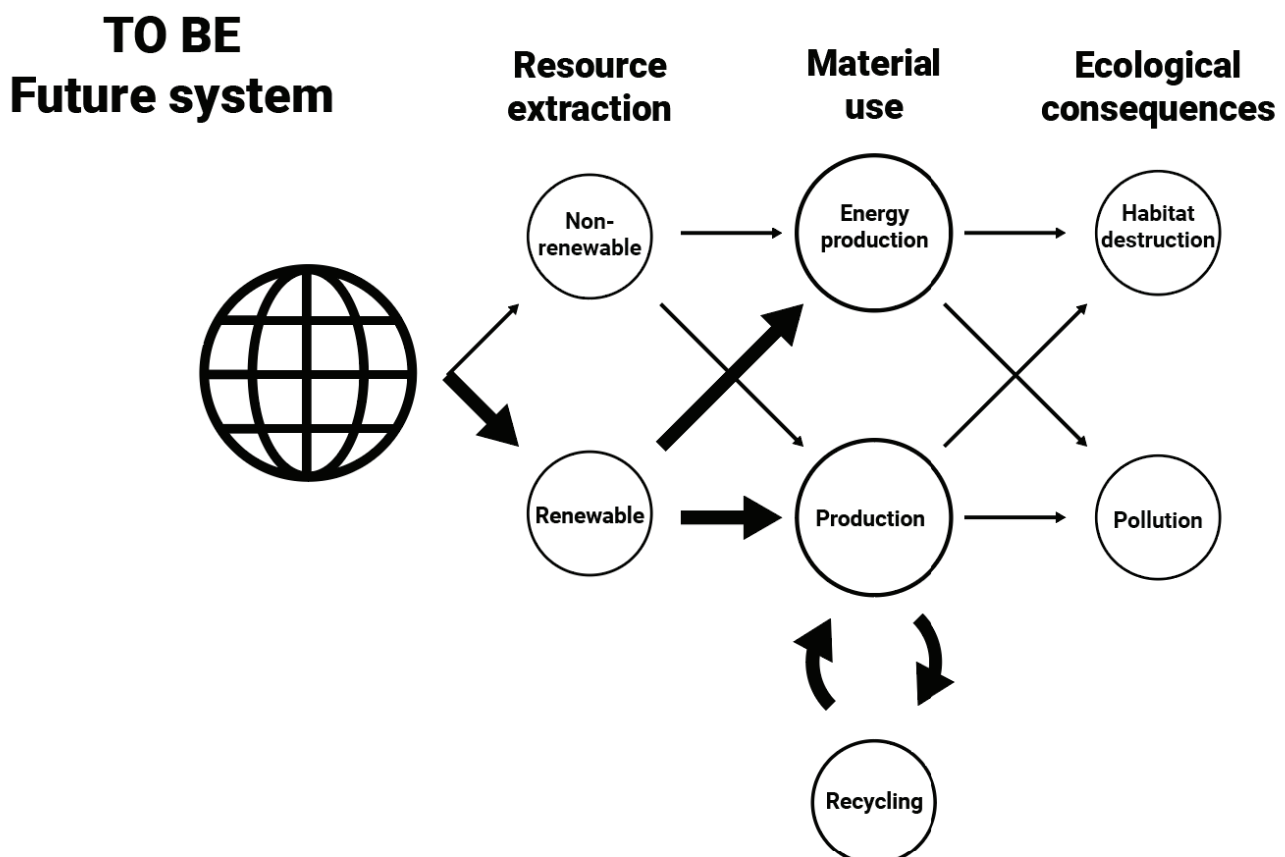
The European Commission (EUC) focusses on encouraging design for re-use and recyclability, not just reducing packaging complexity and materials used, but also redesigning the rules of the system. They call for the use of reusable consumer-owned packaging where possible and experimenting with placing restrictions on the use of certain materials where reusable packaging is a viable alternative (European Commission, 2020).



The EUC aims to develop a policy framework for emerging bioplastics and biodegradable plastics. There is a tendency to promote bio-degradable plastic as a catch-all solution to littering and plastic disposal. But the conditions that the material requires to biodegrade often aren't met in nature or even in some industrial composting facilities.

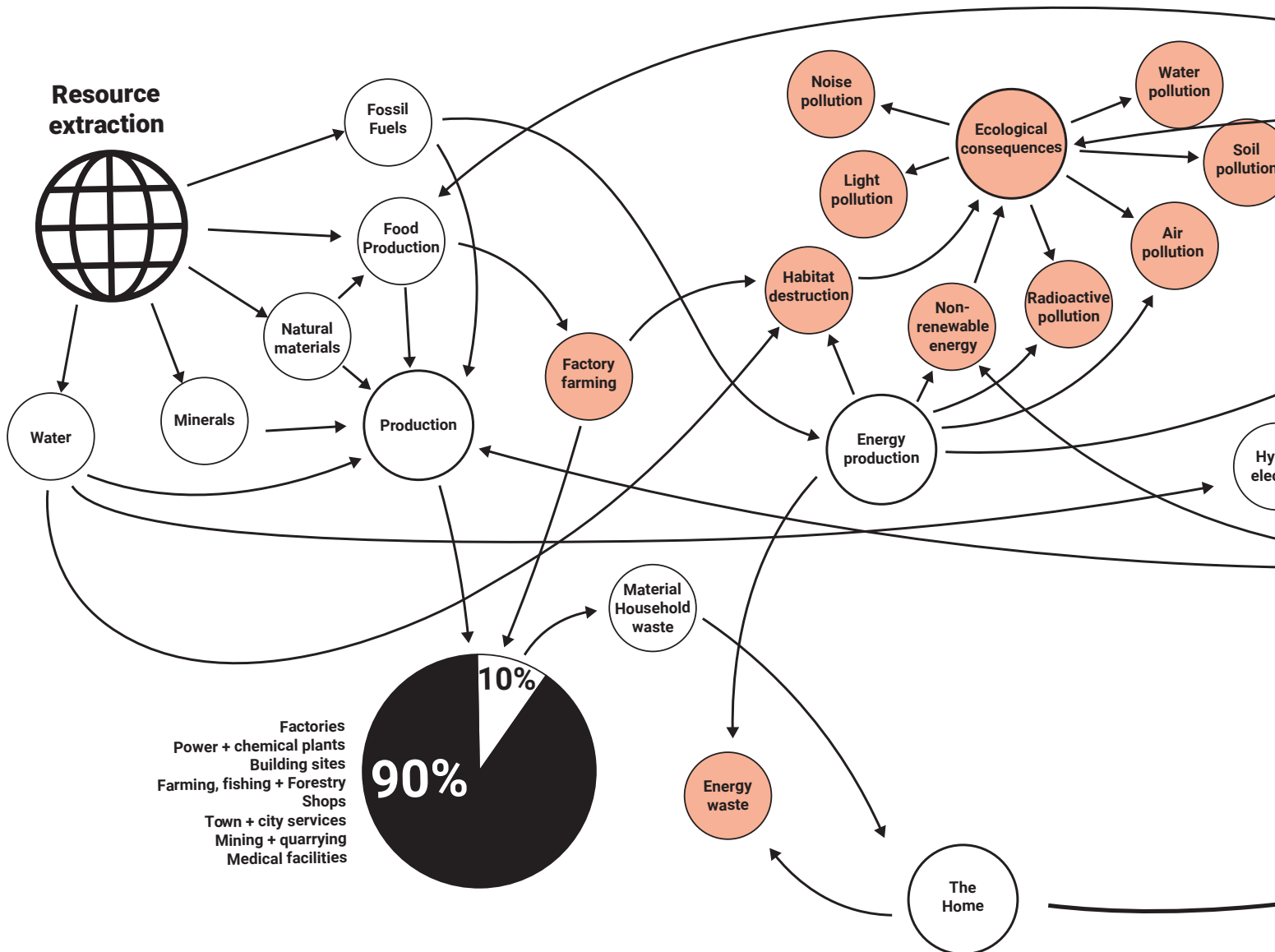
Bioplastic products can be misunderstood by consumers, leading to people leaving them in nature and sorting them into recyclable non-biodegradable plastic streams. The EUC proposes better labelling to avoid this. Goods of Heydays design bureau developed a labelling system for the Nordics that we used for inspiration throughout this project (Sæther, 2020).

Labelling products is only half the battle. Well labelled products need a well functioning system that can handle them correctly. It makes little difference if the material is in the correct waste stream if that waste stream ends up going to an incinerator.



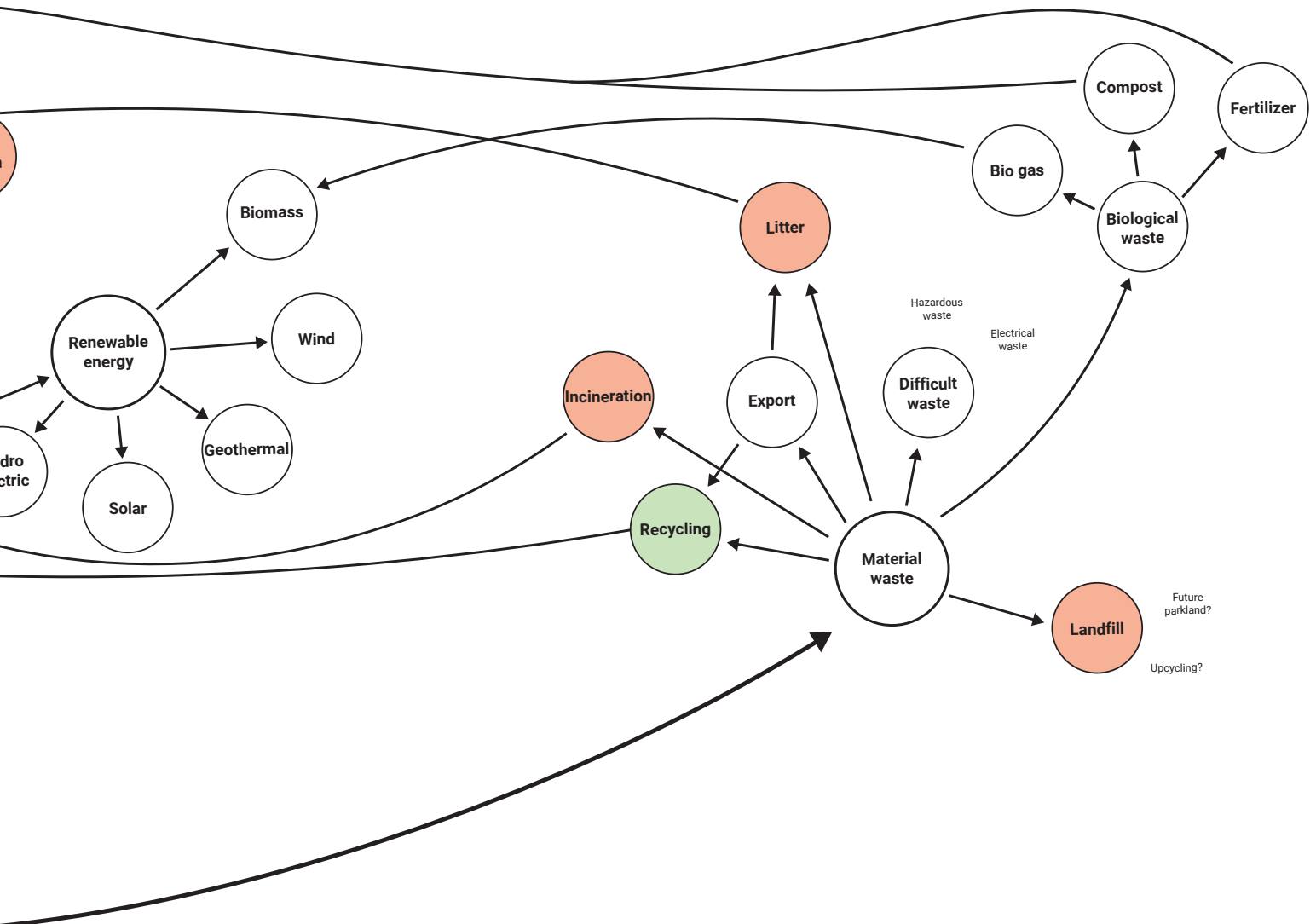
For recycling to work products have to be made of recycled materials.

But recycled materials are an unstable and impure source of materials compared to virgin materials



Recycling is a small part of the bigger shift to circular systems. Long-term we need to shift to renewable sources in every stage of the system, but as long as short-term profits can be made and long-term consequences ignored or paid by others there will be friction in that transition.

Every action that humans take will have consequences, shifting to renewable resources and energy sources will still have ecological consequences. The aim is to transition away from obviously bad systems and mitigate those negative consequences of new, better but untested alternatives.



The bigger picture. Systems with consequences.

3.0 - METHODS

3.1 - PLANNING

3.2 - PERSPECTIVES

3.3 - GIGA-MAPPING

**3.4 - BEHAVIOURAL
DESIGN**

3.1 - PLANNING

Scrum

Our core structure was two to four week periods, choosing a theme for each period and using daily Scrum meetings to guide the process. At the end of the period we reviewed our progress and planned for the next. We created four main phases to put a deadline on each step of the project.

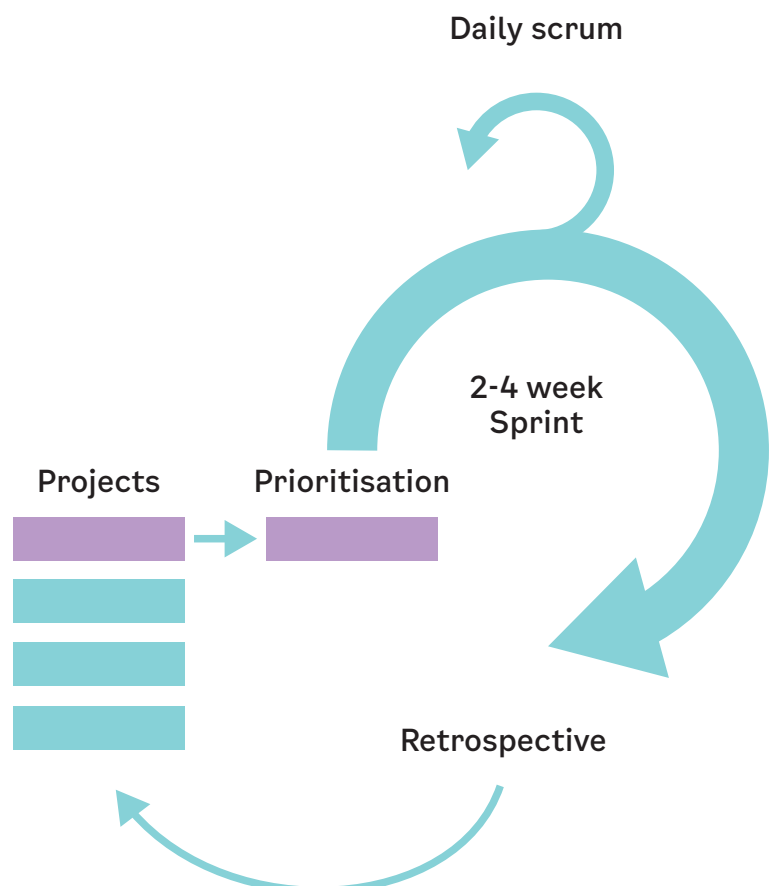
We chose to use Scrum to enable flexibility and allow our research and data to steer the direction of our project.

Using daily SCRUM meetings meant that we didnt have to be afraid of exploring new theory or subjects, because we would quickly review how relevant it was.

As the project grew in complexity, our backlog of areas to explore increased, forcing us to focus on the most important themes and dropping those that we would not have time for.

The Scrum Process

- Prioritisation
- Choose a focus for a 2-week project
- Daily 15 min scrum meetings:
 - What you did yesterday
 - Challenges you are facing
 - Plan for the day
- Present concept + receive feedback
- Implement project
- Retrospective
 - What went well
 - Improvements for the future
- Recalibrate the focus and repeat



3.2 - PERSPECTIVES

Users.

We decided to keep our focus on the users throughout the project, taking a human-centred approach to discover how people experience their role in the waste management system.

We combined hard data from reports (facts and figures), with soft data collected by interviewing, talking to and holding workshops with experts and the general public (thoughts, feelings and emotions).

We wanted to collect a broad range of opinions and perspectives, because everyone has to deal with the same recycling system. The service has to be universal, and every experience matters in understanding who the system is currently failing and how it is failing.

Industry.

We interviewed and talked with Johannes from Grønt Punkt, attended multiple meetings with REG and the head of waste management from Halden council, and we discussed ideas with members of the packaging industry at a SmartPack 2030 workshop hosted by Sintef.

Missing voices.

REG informed us that the users that they knew the least about were young people and immigrants coming from different cultural backgrounds.

Additional perspectives:

Holding workshops with school children aged 15-16 that would have some experience of sorting waste at home and soon be entering the system as adults.

Interviewing waste system users using a toolkit to map personal understanding of their experience with waste management with 20-40-year-olds living with the Oslo system.

Digital surveys exploring people's views on their role in the system, targeting English speaking immigrants, and people at the more extreme ends of the climate change movements (for and against).



3.3 - MAPPING SYSTEMS

Recycling behaviour is affected by many different factors. Systems-oriented design teaches that nothing is unconnected, so we decided to not limit this project to the systems that organisations like REG or GP directly control. We looked at wider social trends, motivations and hindrances both physical and psychological.

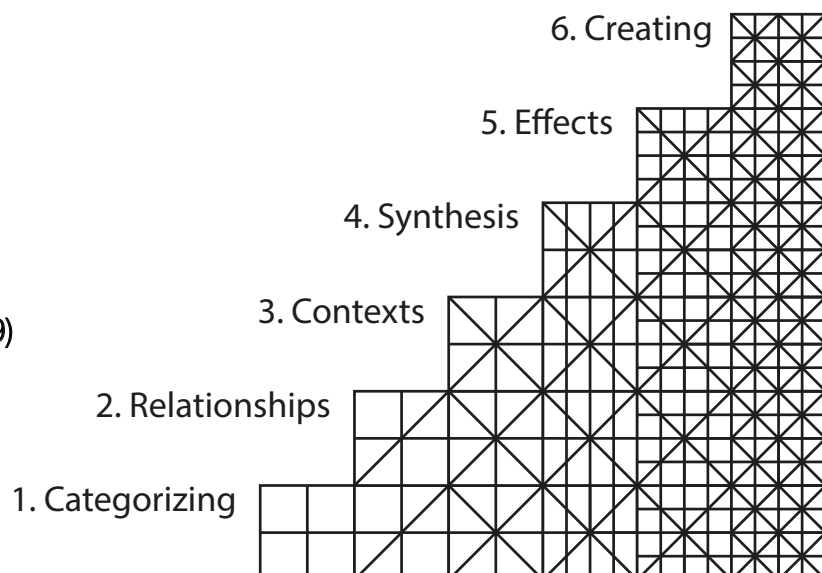
We utilised systems theory to map out and analyse the data that we gathered from interviews, workshops and previous reports. This allowed us to map known problem areas, system limitations, broad concepts and the interaction between the motives of individuals within the system.

We mapped these findings in varying degrees of quality, using the energy that we saw matched the importance of the information. We used Linda Blaasværs from AHO's giga-mapping ladder to guide our mapping process (Blaasvær, 2019). We also taught a three day workshop on giga-mapping together with Nadiya to the 3rd year Bachelor students.

We identified leverage points, negative feedback loops and system barriers in the waste management system. Which we then attempted to solve by finding strong leverage points and designing solutions which took use of them.

We intended to create a display worthy giga-map, but didn't end up creating a high fidelity map for display as it didn't seem worth the energy as there was no ceremony or graduation display due to Covid-19.

A simplification of Lindas Giga-mapping ladder, based on Blooms taxonomy of educational objectives.
-(Blaasvær, 2019)

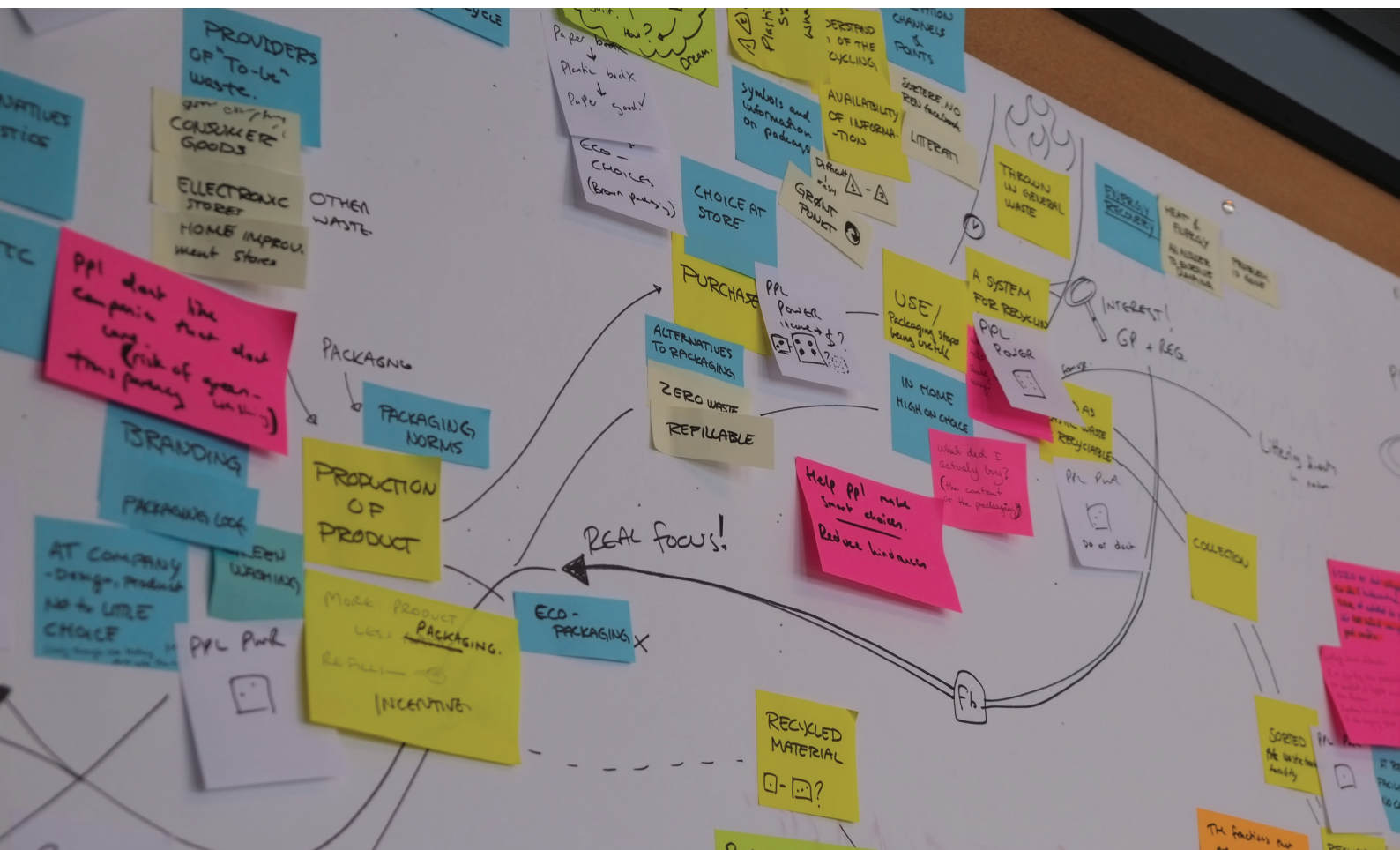


3.4 - BEHAVIOURAL DESIGN

Behavioural design sits at the intersection of behavioural economics, psychology and neuroscience. It aims to utilise changes in physical and digital environments to alter human and organisational behaviour. Behavioural design uses tools and models to understand why a person might want, or not want to engage with a service or a product (Ishan Manandhar, 2018).

Nudging users towards better habits is another component of behavioural design intervention, and is very attractive to organisations because it holds the promise of having significant impacts with minimal effort and without a need for real change (Richard H. Thaler, 2009). REG and Grønt Punkt are both very interested in using Nudging to affect people recycling behaviour.

"Behavioural design works best when the user and the designer want the same thing". We found that people like to spend as little time as possible recycling. This made us question if nudging the user towards doing a better job was the right focus. Perhaps we ought to be 'nudging' the desires of REG to better align with those of it's users.



What should the purpose of the waste management system be?

- To remove unwanted materials from sight?**
- To turn waste materials into something valuable?**
- To return materials to the production cycle?**
- To return materials to natural systems?**

4.0 - UNDERSTANDING

4.1 - MIND MAPS

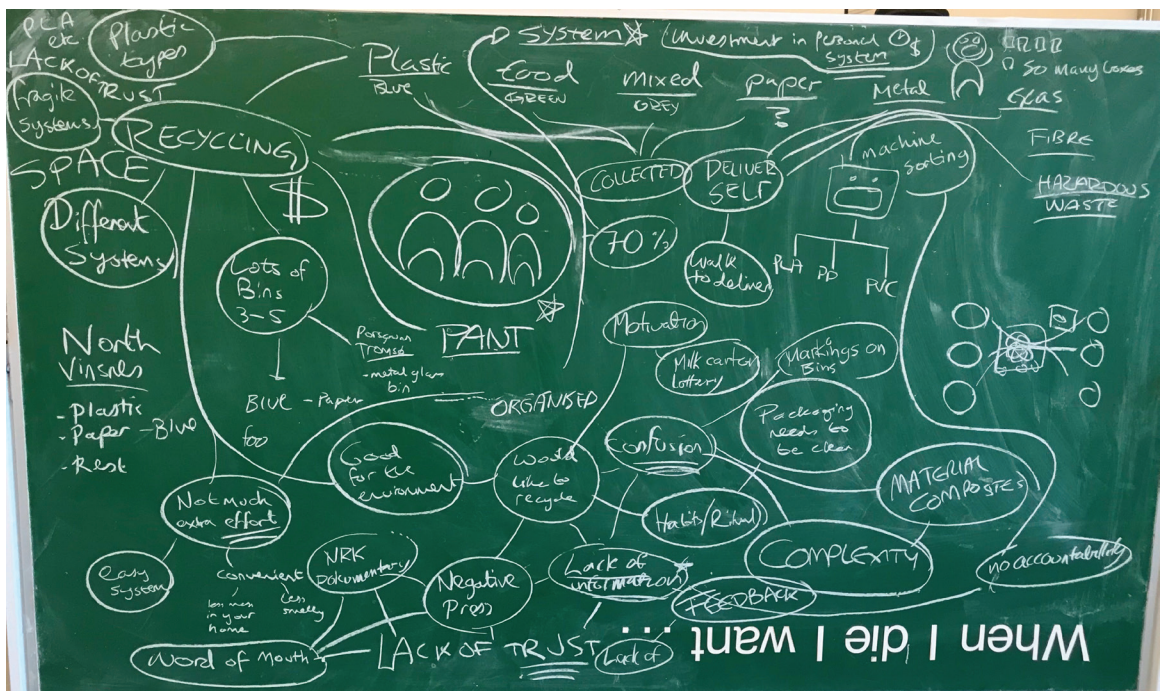
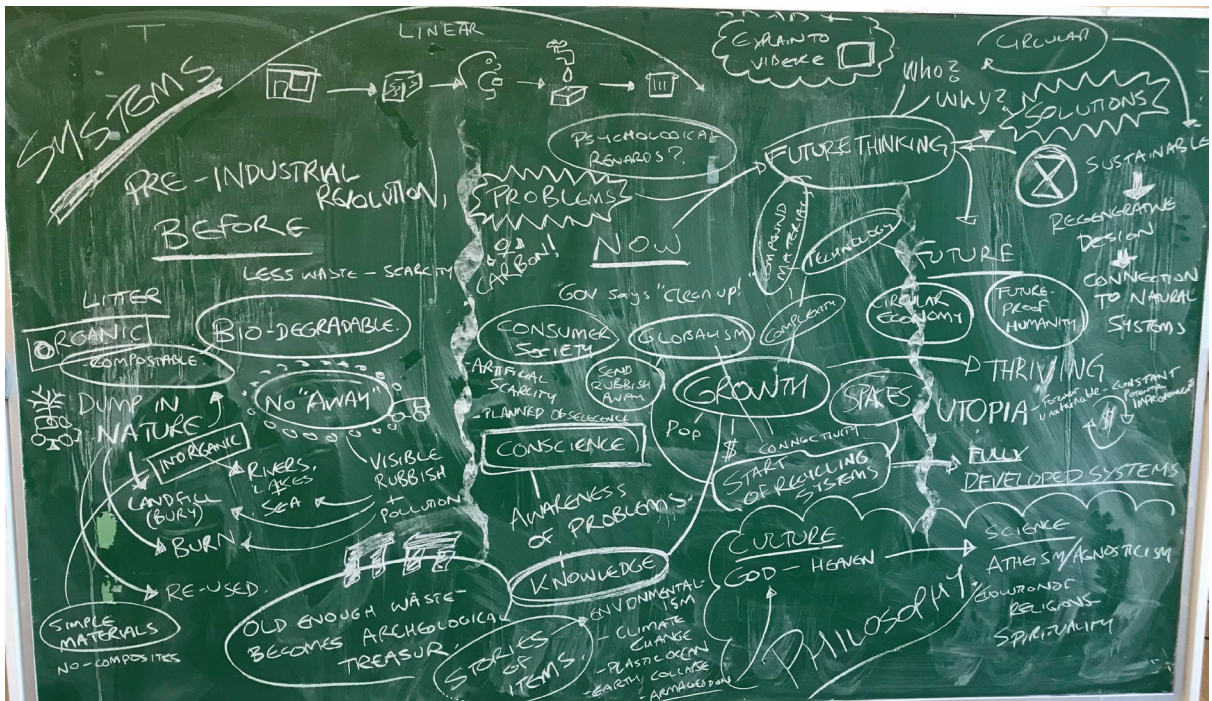
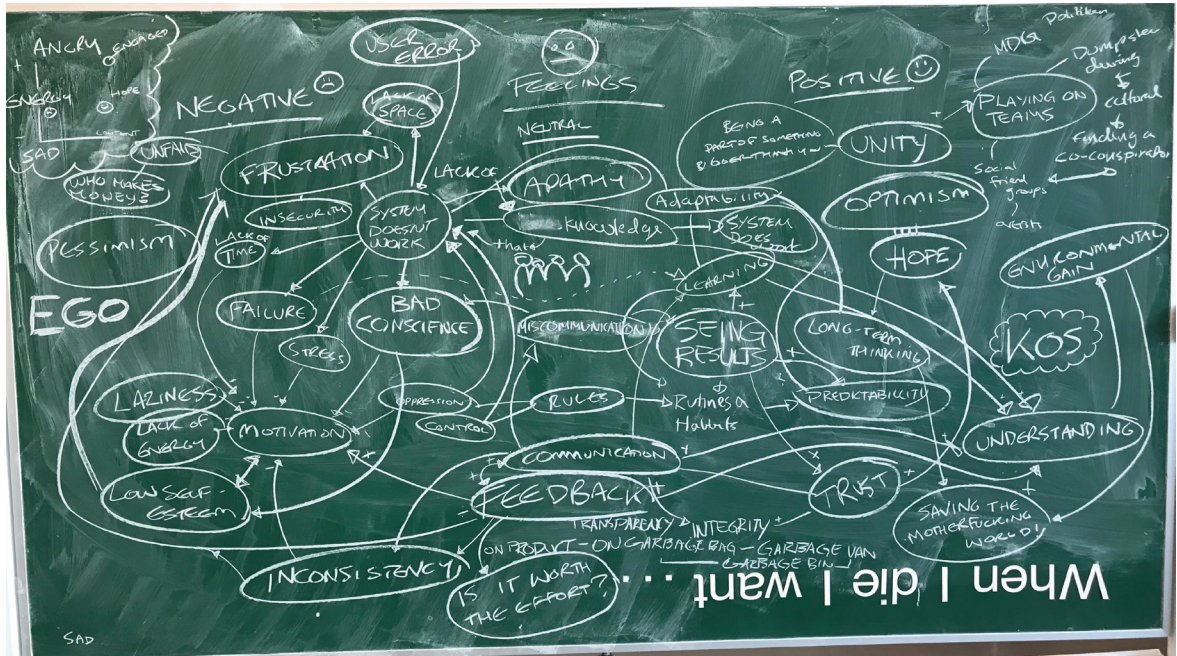
4.2 - USER INTERVIEWS

4.3- USER EXPERIENCE

4.4 - FUTURE USERS

4.5 - INDUSTRY EXPERTS

4.6 - FRINGE USERS

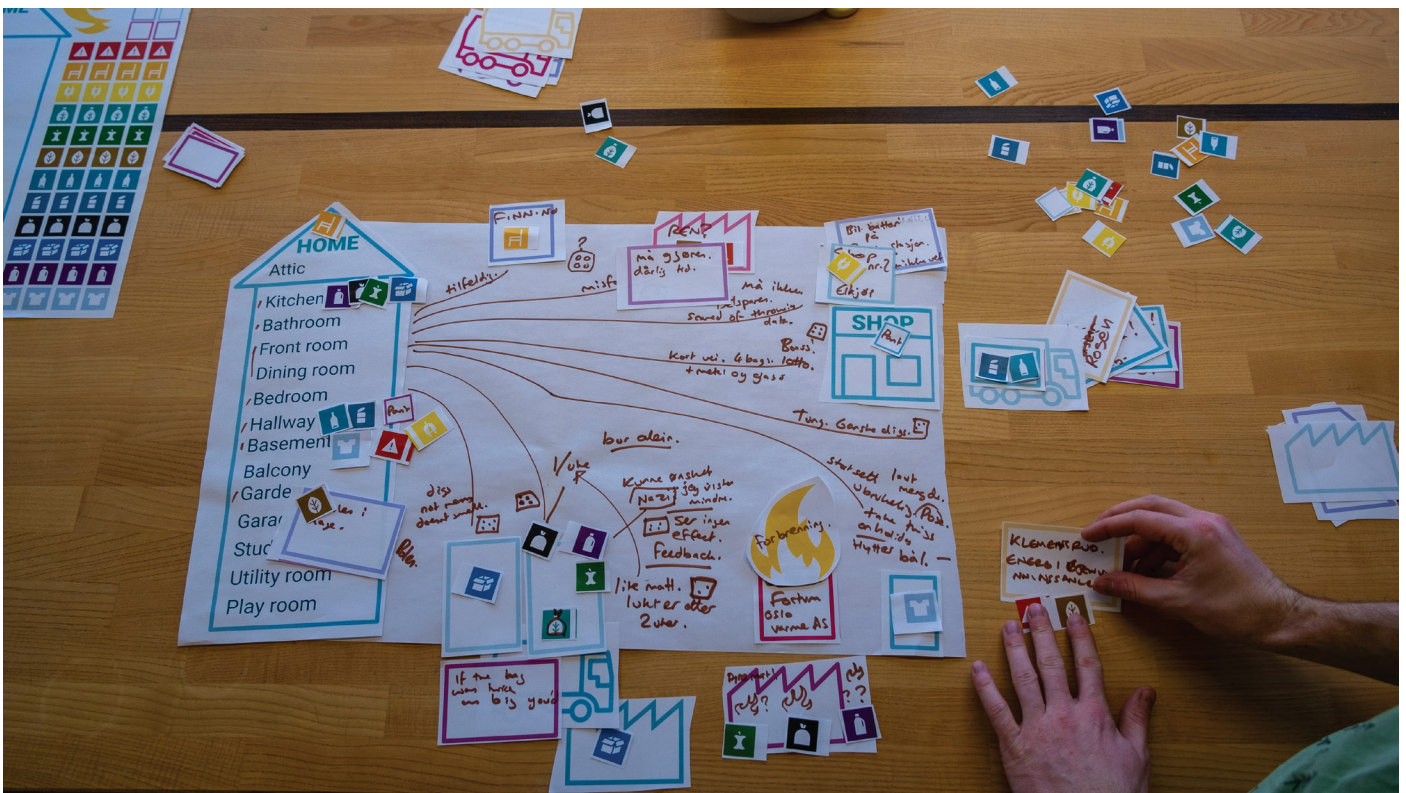


4.2 - USER INTERVIEWS

Conversations, interviews and workshops with users of the REG system in Oslo.

We interviewed a large number of people from different backgrounds to gauge their understanding, opinions and feelings towards the waste management system in Oslo.

For eight in-depth interviews we used a simple toolkit to frame the conversations, encouraging individuals to map out their own understanding of how the system works with the toolkit acting to steer the conversation and trigger reactions, we also charted peoples feelings towards different aspects of the system.



An interview technique that we used was to ask about the recycling behaviours of interviewees friends and relatives, REG had warned us that people tended to bend the truth about their own behaviour in order to make themselves seem better when asked.

Sorting plastic is a relatively recent chore, starting in Oslo in 2010 (Oslo kommune Statistikkbanken, 2019), that people feel obligated to participate in. In general, people seemed to find sorting paper to be understandable and clean, and food waste as smelly, and not worth doing when living alone. Glass and metal waste is dirty, and the distance to collection points is off-putting and plastic waste is confusing.

Despite all of this, most of the people we talked with seemed happy to sort materials for recycling. The benefits of recycling are easy to understand, and the work required is minimal, but there are limits to people's commitment, if it doesn't feel like it is worth the effort, then people are less likely to bother.

People also reported a lack of feedback from the system. People are uncertain about what happens with their waste, whether they are sorting correctly or where to find out or how their behaviour impacts the system.



4.3 - USER EXPERIENCE

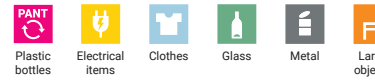
Oslo residents understanding of the waste management system

This map is based on interviews and workshops with Oslo residents exploring their home sorting systems and their understanding of the wider waste management system.

The map starts at **home** where you can see which materials are collected in which rooms, the **coloured icons** representing the different categories of waste.

The **lines** show the waste traveling between stopping points. **Dashed lines** are products moving into the household.

Material icons:



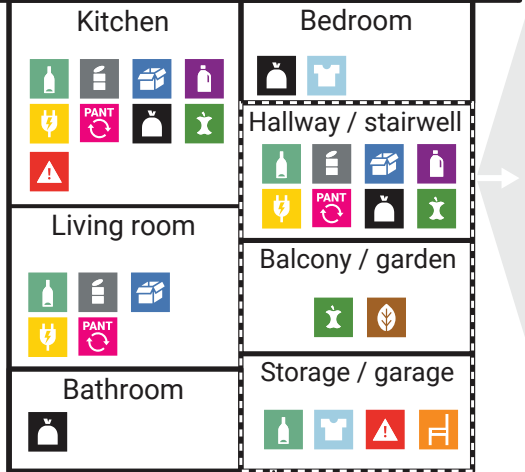
Finn.no

"There are a ton of digital spaces for buying used things, but I just can't be bothered to use them."
"It's a hassle and you have to talk to strangers."

"I love it! You get brilliant things for a fraction of the price, or even free, and you save the environment, not buying new things in the first place".

HOME

Rooms where materials are collected



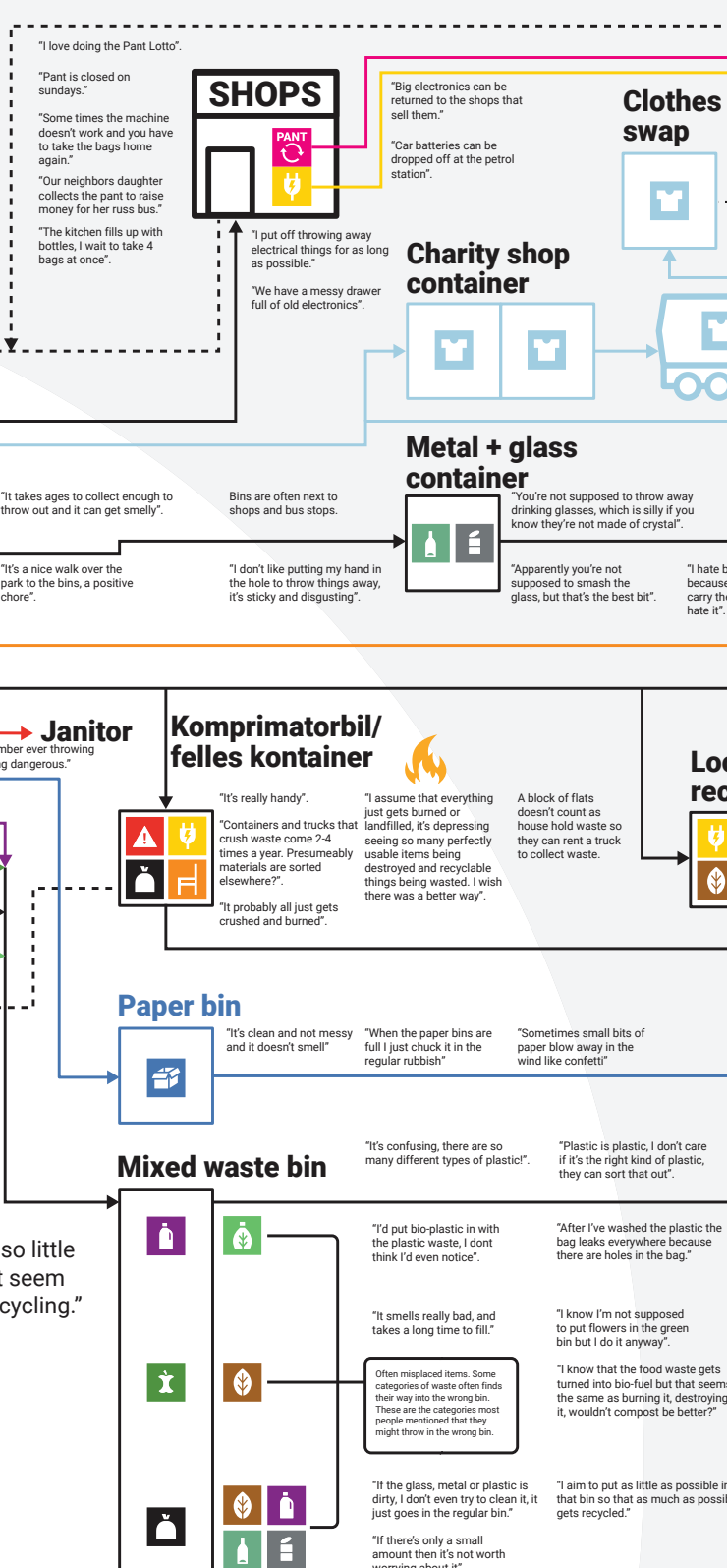
Temporary storage on the way to the bins

Garden/ Parsellhage

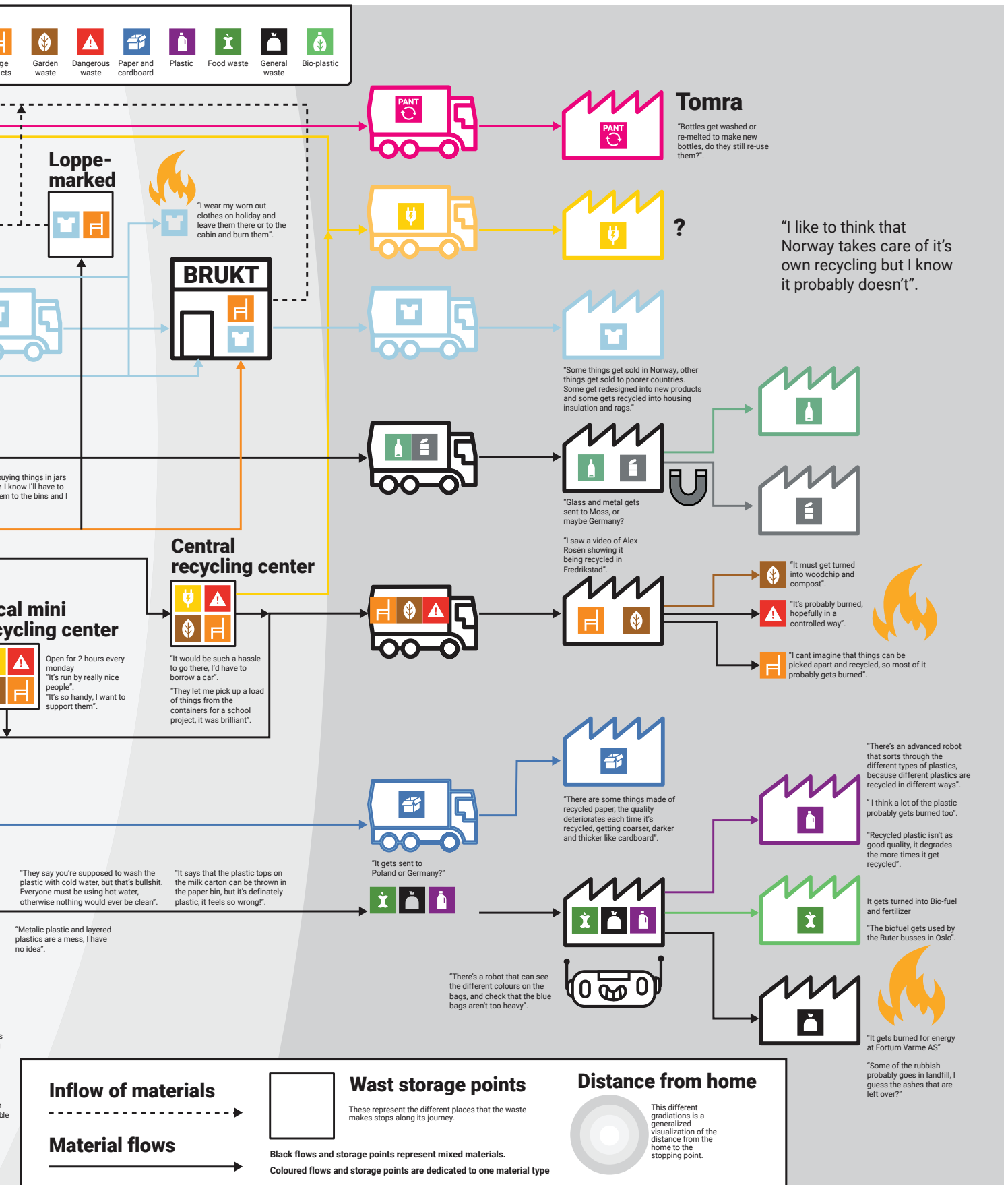
"In the summer we compost most of our raw plant based food waste. It seems silly to burn it when it could be used to make more food."

External storage

"I keep a lot of my old junk at my parents house, they have more space".



An amalgamation of the insights that we received through our interviews, toolkit and conversations.



4.4 - FUTURE USERS

Workshop with pupils, 15-16 years old, at Li Skole



"It's not very fair that we have to deal with all these problems that old people have made"

- Li school student

We teamed up with Nora and Eva, two designers from the first year of the masters working around a similar theme. We decided to hold a workshop with school students together. Our initial plan was to compare the results from Li school where the children would be used to the ROAF system and Bjøråsen school in Oslo (REG system). Unfortunately due to the corona virus lockdown we had to abandon the workshop with Bjøråsen school.

We were able to align our workshop to the schools Sustainable Development Goals week, explaining the relationship that waste management has to the United Nations sustainable development goals to the pupils.

Together we designed a Kahoot quiz that would gauge the pupils knowledge and understanding of the system, with a prize for the winner in each class.

We then asked the pupils to draw a map of their recycling system in their home (most relevant to Nora and Eva's project) and finally we sent them home with a questionnaire to fill in with their family.

The questionnaire collected 23 responses of which 21 were complete, from which we could see that pupils generally felt confident about their sorting habits, certain that they knew what they were doing and trusted the system to deal with materials correctly. From the Kahoot responses where many of the answers were incorrect we could see that this confidence was misplaced.

The pupils were interested in the idea of having a simpler system, in which more of the responsibility falls on the recycler to sort the waste.



One of the maps of their home system that a student drew during our workshop showing their understanding of their waste sorting system. Different colours representing bins for different materials

4.5 - INDUSTRY EXPERTS

Packaging seems to constitute the majority of the waste that people interact with in their daily life.

We were invited to participate in the Smartpack 2030 workshop at Sintef where some students that we had taught Giga-mapping were presenting a project and organising a workshop. We participated in the workshop and were able to talk to representatives from different areas of the packaging industry.

Representatives from the plastic packaging industry were notably absent from the forum, we were informed by other attendees from different sectors that plastic companies rarely attend this kind of event. This could relate to peoples framing of the fossil fuel industry as the 'bad guys' in the struggle towards sustainable systems, making them feel unwelcome.

'We are the good guys, we sequester carbon, where are the plastic packaging companies? They're the real problem' - Quote from a representative of the cardboard packaging industry.

Sharing concept ideas with BA product design students Brage and Regina who also took part in the workshop at Sintef.



4.6 - FRINGE USERS

Survey of different groups in Oslo

In the recycling system in Oslo, people are effectively employed as material sorters for the government.

We devised a Digital survey to explore peoples opinions about their role as a sorter.

We decided to focus on the extreme users of the system as these were the ones most likely to be strongly engaged or dis-engaged with the idea of recycling.

We chose the following groups:

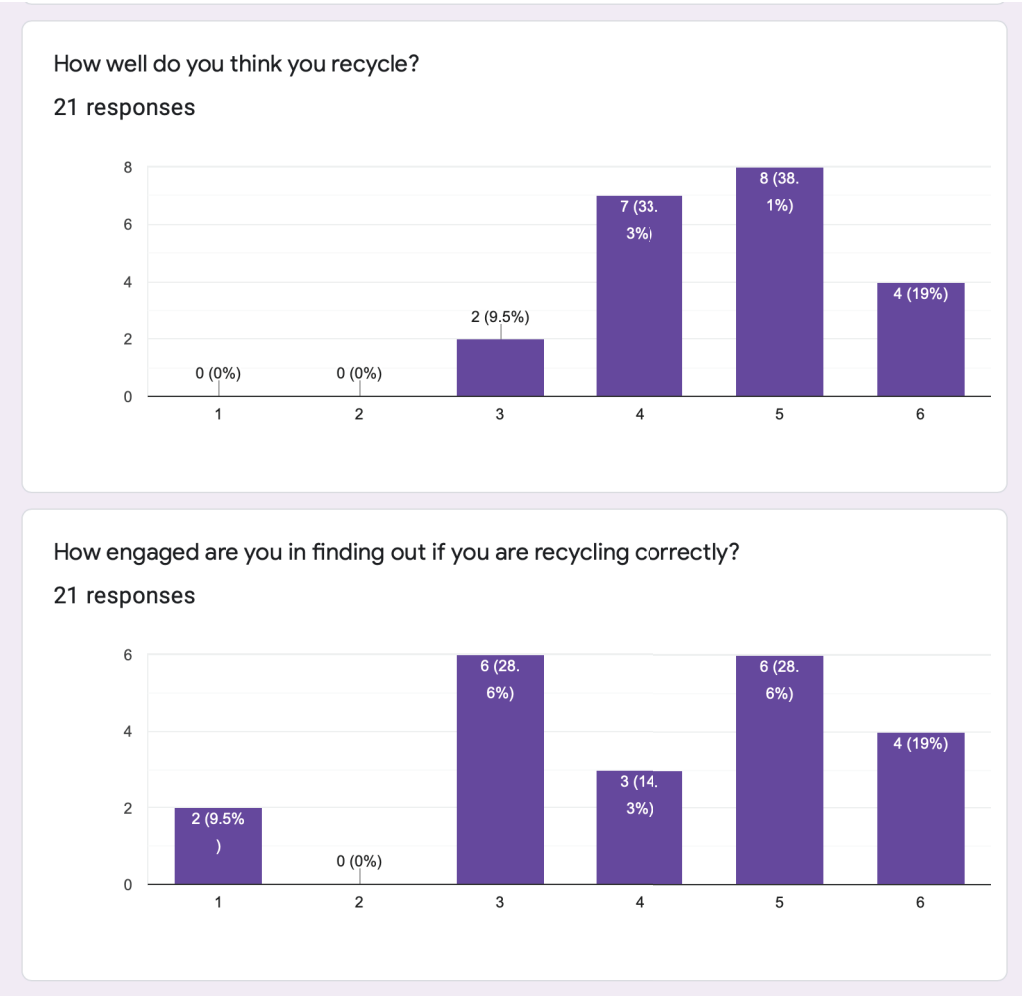
- Environmental activists, with an interest in sustainable behaviour.
- Immigrants in Norway with experience with different waste systems
- Conservatives or those less interested in environmental concerns.

We posted the survey to different groups on Facebook to be able to compare their responses. Unfortunately, we were unable to display the survey to any conservative or anti-environmental groups as they were very authoritarian about what kind of post was allowed to appear on their pages, this could be due to a lack of interest in the theme of recycling.

Are people happy with their role as a recycler?

The survey explored peoples perceived happiness regarding their role as unpaid employees in the system using the six factors of a happy career as listed by the consultancy firm ' Happiness Works' in the UK (Half, Robert (2020).

- **Right fit.** Are you up to the task of sorting waste stream in your home? Do you feel well enough informed to sort items correctly into the different waste streams?
- **Sense of empowerment.** Do you feel empowered to contribute to the work of waste sorting in your home? Do you have everything you need (tools and information)?
- **Feeling appreciated.** Do you feel recognised for the work that you do in recycling?
- **Interesting and meaningful projects.** Do you have the opportunity to participate in exciting and significant projects related to recycling? Do you engage in recycling outside of your home?
- **Sense of fairness.** Does your role in the waste system seem fair? Do you feel that it is your responsibility to sort materials for the county?
- **Positive workplace relations.** Are there positive relations regarding sorting and disposal of waste in your house?
- **Doing worthwhile work.** Do you feel that the work that you do sorting materials is worth the time and effort that you put into it?
- **Interest in your work.** How interested are you in becoming a better material sorter?



"No companies that I know of recycle. It is just the individuals that are burdened with it."

"If it all didn't go in the same truck and then crushed together I would recycle correctly"

"I struggle with my mental health and sometimes struggle to have the energy to be too fastidious with recycling."

"I think it's a bit idealistic and unrealistic to expect everyone to responsibly and correctly sort all of their own recycling."

"I think its great you have to recycle, I find it bloody annoying that my neighbours don't seem to get it."

5.0 - FINDINGS

Everything in life is temporary and has to be disposed of eventually. More and more of the items that we use are unable to be returned to natural systems.

How do we encourage thoughtful growth in balance with the environments that we inhabit?

5.1 - DESIRES

5.2 - INTERVIEW FINDINGS

5.3 - WISHCYCLING

5.4 - CHALLENGES

5.5 - HURDLES

5.6 - PRODUCERS

5.7 - AREAS OF INTEREST

5.1 - DESIRES

Motivations of the different stakeholders

The user wants to buy cheap, high-quality items that function as they are intended to and last as long as they are needed. When an object no longer serves a purpose, they want to be able to dispose of it quickly and without any fuss.

The designer may desire to earn their income creating innovative, beautiful, functional objects of use that can last a long time and not cause damage at the end of its life. Unfortunately, the designer can end up creating traditional, ugly, poorly-functioning and useless objects that quickly break or become obsolete and cannot be recycled. Companies that do invest time and money in designing products well can still have them fail when they enter a waste system that they do not fit.

The packaging industry wants to produce packaging as efficiently and cheaply as possible, innovating enough to stay relevant when necessary and adapting to the changing desires of the purchasing population. They have a vested interest in continuing to create packaging.

Grønt Punkt wants to help producers to take responsibility for the waste that they produce by helping them to calculate and cover the costs of its disposal. They want to stay relevant against competitors in the same field, balancing keeping their offer desirable to businesses without failing to fulfil its purpose.

The waste management system (REG) wants to collect waste efficiently and cheaply and sort it into clean fractions for recycling. They are dealing with limited budgets and inherited systems that are designed to deal with the most unprofitable stages of the material system.

The government wants a strong and growing economy and to be competitive globally. They work to keep people happy in the short term to maintain power while appearing to have the long-term welfare of people in mind.

5.2 - INTERVIEW FINDINGS

Purchase

People don't intend to buy packaging, and they don't tend to think about it until it comes time to dispose of it.

There isn't always a recyclable choice when making a purchase, if a product continually frustrates you, there may not be a better alternative available.

Disposal

People tend to be optimisers, sensibly using the least amount of energy necessary to complete a task, if it doesn't seem worth it to sort waste then they won't.

To partake in waste sorting an inhabitant has to have a system for sorting in their home, they need an understanding of how the system works, and they need to have the time, energy and desire to participate in sorting their waste. If they decide not to participate they suffer no negative consequences.

People get frustrated when materials are mixed and combined in ways that make it difficult or impossible to recycle, or unclear into which bin it should go.

Labels on products can be misleading, confusing, misunderstood or simply absent.

If frustration occurs at the point of disposal, there are a myriad of platforms to criticise it, who is responsible? Should you message the waste management system, retailers, producers, Grønt Punkt? Many of the digital platforms where you can voice frustrations are under the control of the organisations being criticised.

Understanding

Some products are theoretically recyclable, but not within the existing system. Finding out that you have paid more to make more environmentally conscious choices only for that effort to be wasted when your city doesn't recycle that material is disheartening. Compostable alternatives to single use plastic items are very popular in Oslo despite not being composted.

Increasing your understanding of the functioning of the system and seeing its failings can lead to reduced motivation to recycle, ironically causing more damage to the recycling systems efficiency in a reinforcing negative feedback loop.

5.3 - WISHCYCLING

'The least you can do as an organisation is what your customers expect you to be doing.' - Joost Holthuis

The REG system aims to be as efficient as possible within its limited budgets. Many operations are automated, designed to manage 'ideal' waste streams, resulting in small margins for error. They are not designed to handle the reality of what their fallible users feed them.

WishCycling, as Leyla Acaroglu describes it is *"when people who are so conditioned to 'do the right thing' that they toss whatever they wish could be recycled into the recycling bin."* (Acaroglu, 2019). People tend to be optimistic, if a product is compostable, then they assume that waste system will compost it, and if it is recyclable they presume that it will be recycled. Acaroglu describes the current recycling system as un-unified and complex, leaving most of the responsibility in the hands of the people burdened with the waste.

The rules of a recycling system can clash with our internal reference systems. Flowers decompose, so people 'wrongly' sort them as organic waste. Hard plastic products, crisp packets and polystyrene are 'wrongly' classified as plastic waste. We form strong relations to our perceptions of an object and find it hard to change them. The situation is further complicated by materials that are hard to distinguish, even for experts, and composite and laminated materials.

Wishcycling frames the problem as the user engaging in a bad habit, behaviour that we need to change (Domtar, 2019), (Mogensen, 2019). The recycling companies and institutions in Norway call for nudging to correct this behaviour, but you can only nudge people so much, and it might not have the desired effect, if the problem lies higher up in the system.

WishCycling can be re-framed as Nudges from the users to get the producers and the recycling industry to change their behaviour.

5.4 - CHALLENGES

Inflexibility

The waste system that REG has is unable to adapt to an evolving waste stream. There is no system to deal with new materials. Innovative new products made of compostable materials are not able to be composted in Oslo.

Enthusiastic companies experimenting with bio-mimicry could create amazing products designed to return nutrients to the soil in order to create a regenerative system. These fantastic products would end up being incinerated by the Oslo system.

New products made of different plastics and composite materials will continue to enter the waste stream and pollute the mixed fractions.



Fragility

No matter how perfectly one designs a system, people will find an unanticipated way to use it. The system in Oslo is dependant on good behaviour. It will become less effective if people lose faith in the system or misuse it.

It is not a good sign that people with an interest in finding out how the system works can become more demotivated and frustrated the more they learn.

The system needs to be more resilient and able to tolerate improper behaviour, possibly even utilising unexpected behaviour to guide its design to capture more realistic user experiences.

Resilience is a measure of a system's ability to survive and persist within a variable environment. The opposite of resilience is brittleness or rigidity. *"The ability to bounce or spring back into shape, position, etc., after being pressed or stretched. Elasticity. The ability to recover strength, spirits, good humor, or any other aspect quickly."* (Meadow, 2008, pg 76.)

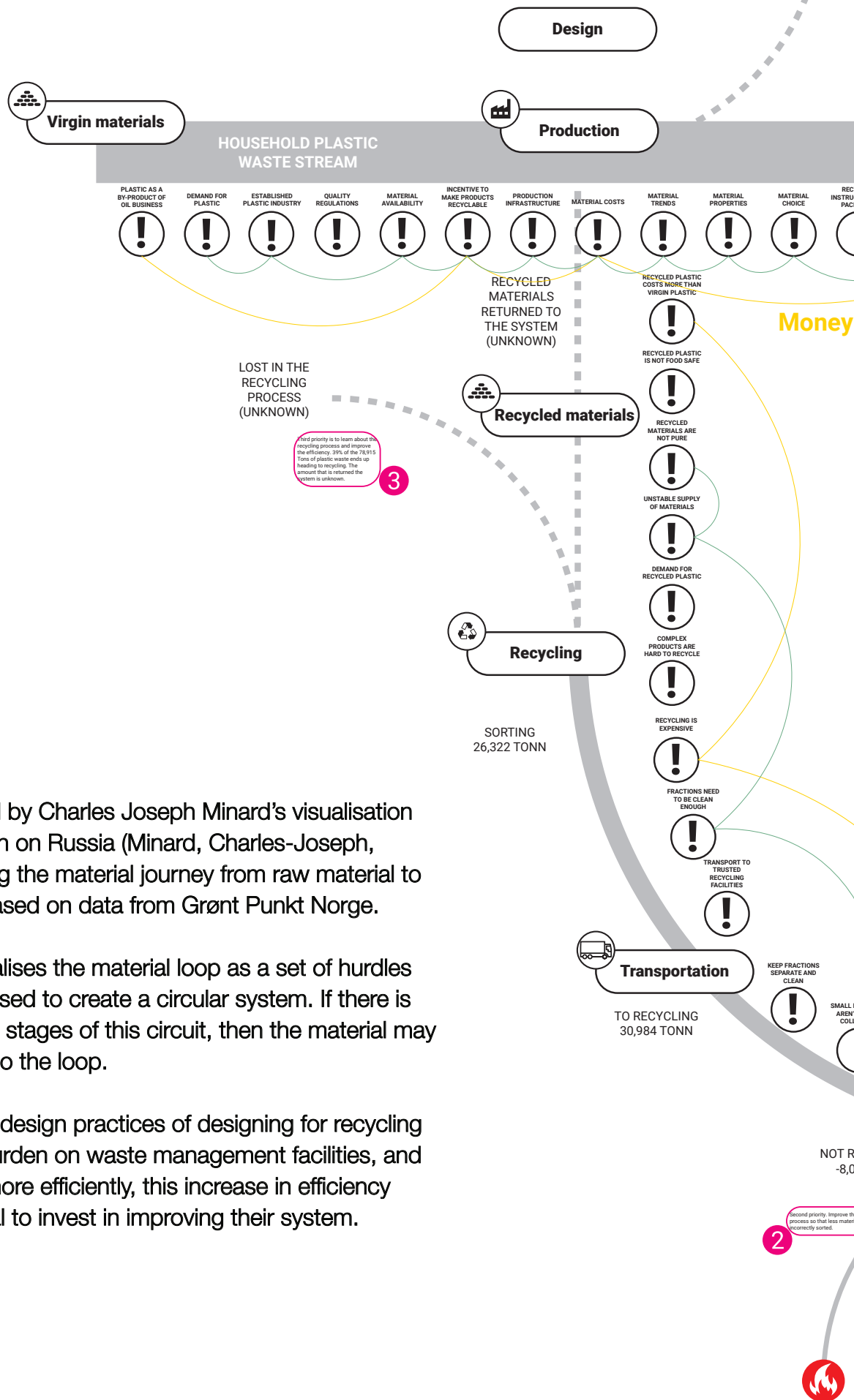
Invisibility

Waste management happens behind the scenes. People stop thinking about waste once it enters the bin. It is a challenge to improve peoples behaviour when they do not see the consequences of those behaviours.

Invisible systems need clear communication if they want to interact with their users.

"Bounded rationality means that people make quite reasonable decisions based on the information they have. But they don't have perfect information, especially about more distant parts of the system. Fishermen don't know how many fish there are, much less how many fish will be caught by other fishermen that same day." (Meadow, 2008, pg 106.)

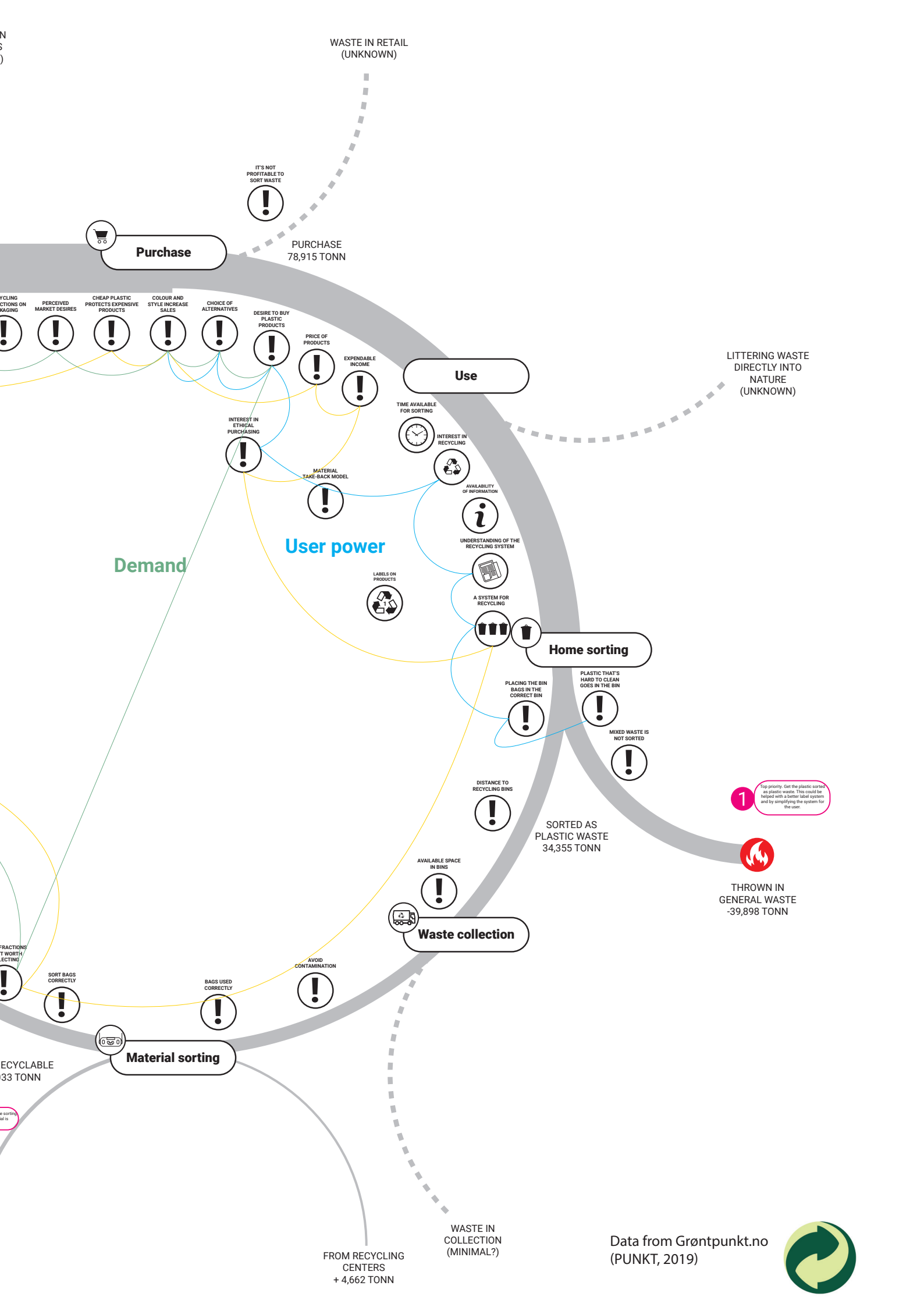
5.5 - HURDLES



This map is inspired by Charles Joseph Minard's visualisation of Napoleon's march on Russia (Minard, Charles-Joseph, 1781-1870) showing the material journey from raw material to recycled material based on data from Grønt Punkt Norge.

The illustration visualises the material loop as a set of hurdles needed to be traversed to create a circular system. If there is friction at any of the stages of this circuit, then the material may not make it back into the loop.

Encouraging better design practices of designing for recycling would lessen the burden on waste management facilities, and allow them to run more efficiently, this increase in efficiency could free up capital to invest in improving their system.



5.6 - PRODUCERS

The EU mentions in their Sustainable Product policy that: *'It is estimated that over 80% of all product-related environmental impacts are determined during the design phase of a product.'* (European Commission, 2018)

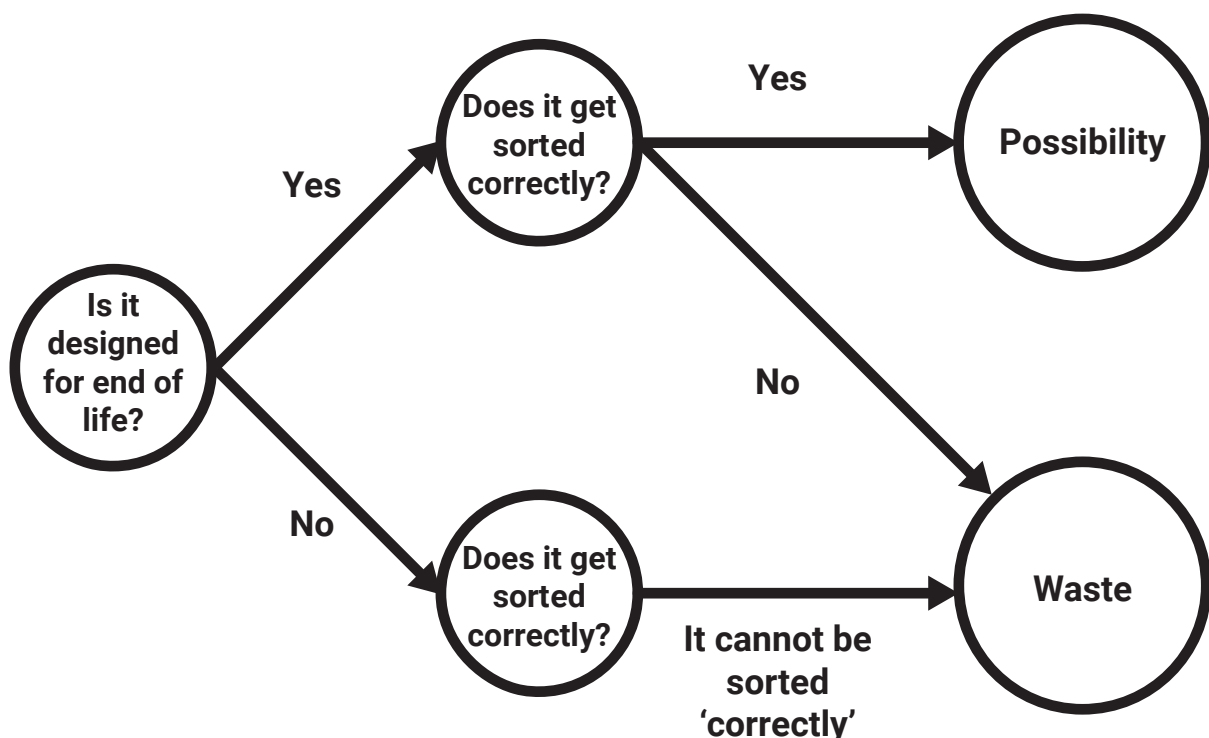
Products vary wildly, and their uses are complex, but the fact is that products can either be designed for responsible disposal or not.

The system the product finds itself in may be unable to deal with it as the designers intended, and users do not always dispose of products correctly, but if it has been designed in a way that makes responsible disposal impossible, then it cannot be responsibly disposed of.

Producers put money and effort into influencing consumer habits through design and marketing. They decide how much packaging to use, and how long a product should last, sometimes designing a premature end through planned obsolescence (Lasswell and Packard 1960).

It was interesting to observe through our survey of fringe users and workshops with school pupils, how few put the responsibility for recycling on the producers of products. People mentioned themselves first and then the government as the ones that should be responsible for waste recycling.

The first hurdle



Shifting the blame

The shifting of blame from producers of waste stems from as far back as the 1970s, when a group of beverage producers together funded the Keep America Clean campaign. The campaign was in response to increasing amounts of litter in nature. The famous advert featured a crying Indian, and pushed the blame onto people and away from the producers (Dunaway, 2017).

Grønt Punkt carries a similar message, urging people to take personal responsibility, which might be expected when the organisation is owned and run by a board of business representatives.

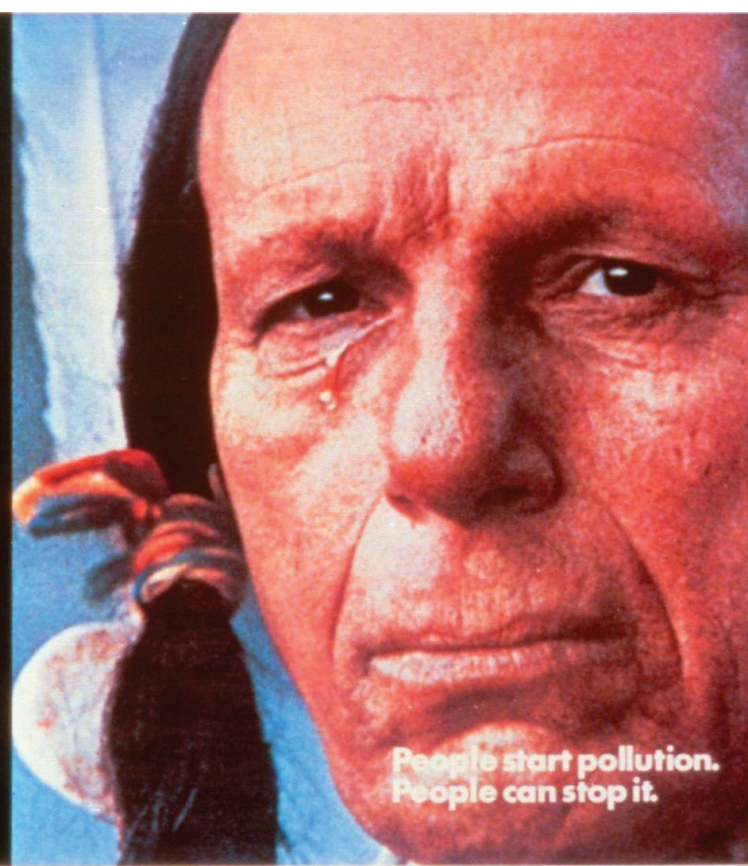
Similarly REG states in their mission statement that it is the consumer's responsibility to sort their waste.

"In Oslo it is mandatory for everyone to sort their waste and ensure that the waste you produce is dealt with correctly. Correct waste sorting at the kitchen counter and in daily life allows our environment and city to thrive".
-(Oslo Kommune, undated).

(Dunaway, 2017).

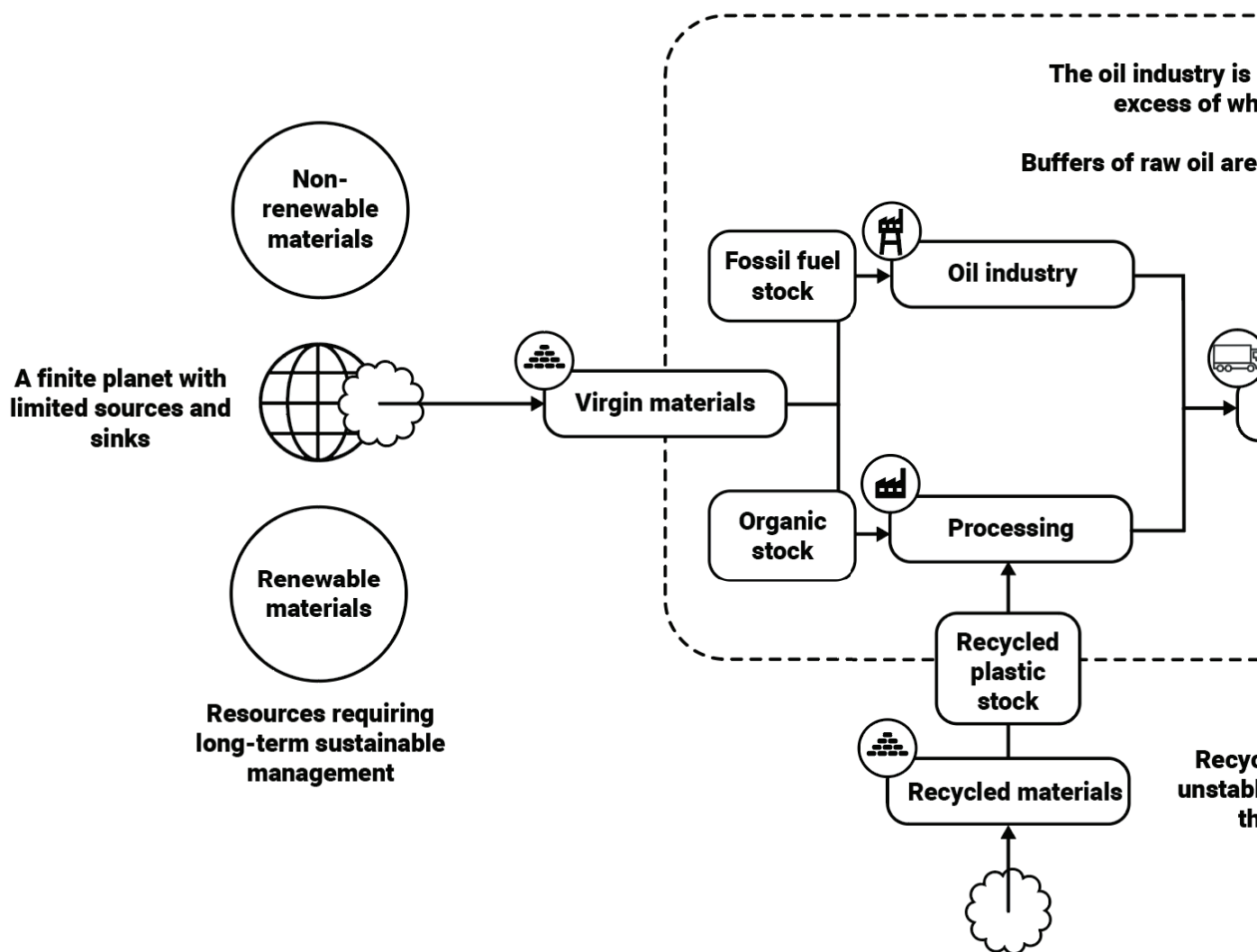
**GET INVOLVED
NOW.
POLLUTION
HURTS
ALL OF US.**

You can help by becoming a community volunteer. Write:
Keep America Beautiful, Inc.
99 Park Avenue, New York, New York 10016
A Public Service of Transit Advertising & The Advertising Council.



During the extraction and manufacturing phase of production, there is very little waste. The 'closed loop' system of the production process values efficiency. Any wasted material is revenue lost. With the correct incentives, in this case, profit, it is possible to reduce waste when it is in the interest and power of producers. As soon as the product leaves the 'gate' however and enters the market, the responsibility is passed on to the next stakeholder, first the retailer, then the customer, and then the waste management system.

Household waste constitutes around 10% of a country's waste stream, with most of that waste coming from retail. There is no incentive for retailers to recycle their waste if it costs more than alternative methods of disposal. (It would be interesting to explore how much waste disposed of by the retail industry is cleaned and correctly sorted for recycling.)



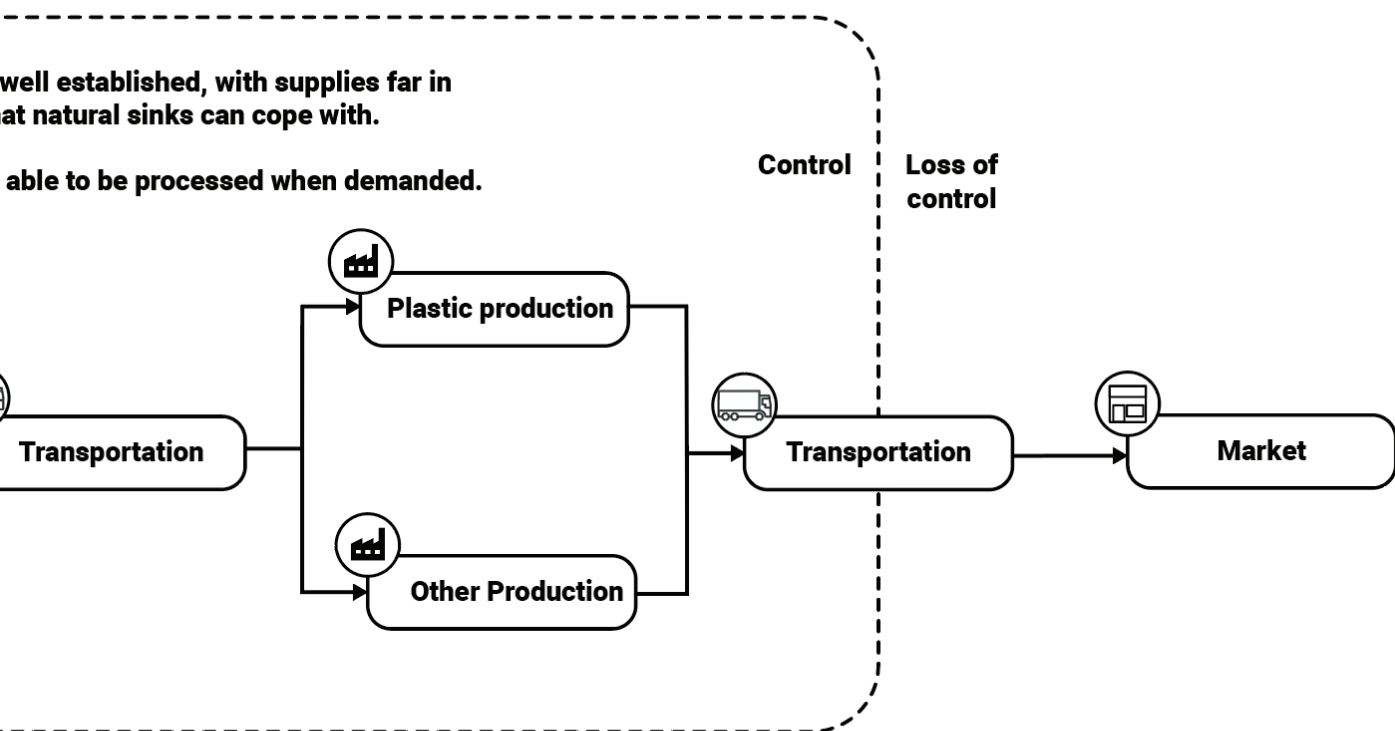
When customers buy a bottled drink, it is the liquid that they want, the plastic bottle is just a convenient way to transport it to their lips.

In Norway, there is a closed-loop system for bottles, called pant, where the customer is added to the loop by giving the bottle a monetary value when correctly disposed of (Tomra, 2020).

Tomras system in Norway has a collection yield of 98% of all the plastic bottles in it's system. This is a much higher percentage than any other fraction of waste in Norway and the purity of the material stream means that most of this plastic reaches a raw-material state again. The pant system gamifies the collection of bottles and makes it more engaging than throwing them in a recycling bin.

EFFICIENT UNTIL PRODUCTS LEAVE THE LOOP

CLOSED SYSTEMS



Recycled materials vary in quality and have an unreliable supply that is dependent on fluctuations throughout the entire material system.

5.7 - AREAS OF INTEREST

People

Where do people have power within the system?

Choices

Free market failure

People don't have a choice if it is not offered to them,

Policy

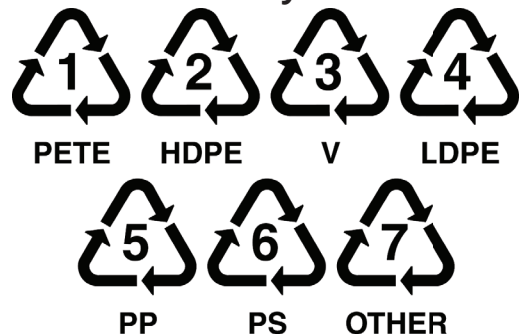
How does government policy influence the system?

- Plastic Ban, Straws, bags, balloons
- Encouraging alternatives to plastic
- Taxes on packaging

Investments in the system - Push back from those profiting from the status-quo

Plastic symbols

What do they mean?



Money

Capitalism and motivation

- Push back from those profiting from the status-quo
- Incentives to continue unsustainable but profitable practices.

Producers

Creating waste as a by-product

- Cost of transporting unnecessary packaging
- Peoples opinions of companies that don't care
- Branding and look, Greenwashing

EST

Agile economy

Need for flexibility

Control - Regulation - Delay

If we want the best possible offers the systems will be in constant flux and unstable. New items alter the system.

Understanding

Where do things go?

- Symbols/ information on items
- How does recycling system work?
- Sources of information
- Why is it important?

Purchasing

Creating

- Little or no choice over packaging
- Desire a product, receive unwanted packaging
- Eco-friendly packaging and alternative products and systems
 - Zero waste
 - Refills
 - Home delivery

Information sources

How available is the information?

Grøntpunkt.no
Sortere.no
Kildesortering Oslo

Symbols

What do they mean?

- Plastic recycling symbols
- Svanmerke
- Angelmerke
- Fairtrade
- Grønt Punkt

Home system

What is needed

- Space
- Time
- Energy
- Motivation
- Physical system
- Knowledge
- Coordination

6.0 - CONCEPTS

Producers are creating products that cannot be recycled.

Packaging is useful until it becomes an unwanted by-product

Customers have limited choice and little power to change that fact directly.

Waste can be frustrating to dispose of.

The recycling system is forced to deal with whatever people throw into it.

6.1 - SOLUTIONS

6.2 - LEVERAGE

6.3 - IDEATION

6.4 - VISION

People have limited knowledge of the materials and waste management system, which results in them incorrectly sorting and Wishcycling. REG and GP are working to improve people's knowledge about the system and guide them, but this method is doomed to playing "catch-up" with developments in packaging design and material science.

It would be much more efficient to work closely with the producers and make them take direct responsibility, at the design phase of their products.

Grønt Punkt ought to have this role, but is limited by the power KLD gives them (Klima og Miljødepartementet) and the conflict of interest from being owned and run by Industry representatives, making it harder for them to push for change (Grønt Punkt Norge, Undated *2).

The limits of capitalism are reached when it comes to the waste system. REG has a limited capacity to change its behaviour due to budget constraints and lack of mandate from politicians. The government has stepped in where Industry cannot make a profit and fails to fix the problem of waste because it is not able to address the cause.

If the responsibility is to be forced on people in their homes, how can we facilitate for people to be able to nudge the system towards better behaviour?

6.1 - SOLUTIONS

Encourage citizen engagement.

Some people don't care about recycling and are unlikely to start caring. Create systems that can withstand the actions of those that are disengaged, and make sure that their actions will not damage the system.

Co-creation.

The system ought to work for and be designed by the people forced to use it. Norwegian culture embraces collective action. The Dugnad is a powerful method for achieving significant results from small individual collaborative contributions.

Crowdsourcing.

Allow people to get involved. People know what frustrates them better than anyone else. Give them a chance to feedback that frustration in constructive ways. Utilise the power of large numbers of engaged people to pinpoint areas of frustration and find out where to focus energy on improving.

Self organisation:

Create simple rules that combine to create the desired behaviour. *"The most marvelous characteristic of some complex systems is their ability to learn, diversify, complexify, evolve"* (Meadow, 2008. pg 79). Try to set things in motion that are self-sustaining and build on themselves.

Flexibility.

Static systems tend to break under tension. Attempting to force submission causes unnecessary stress. Areas and cultures differ around Norway and the world, and behaviours and market change constantly. The system needs to incorporate flexibility and be able to adapt to changing needs.

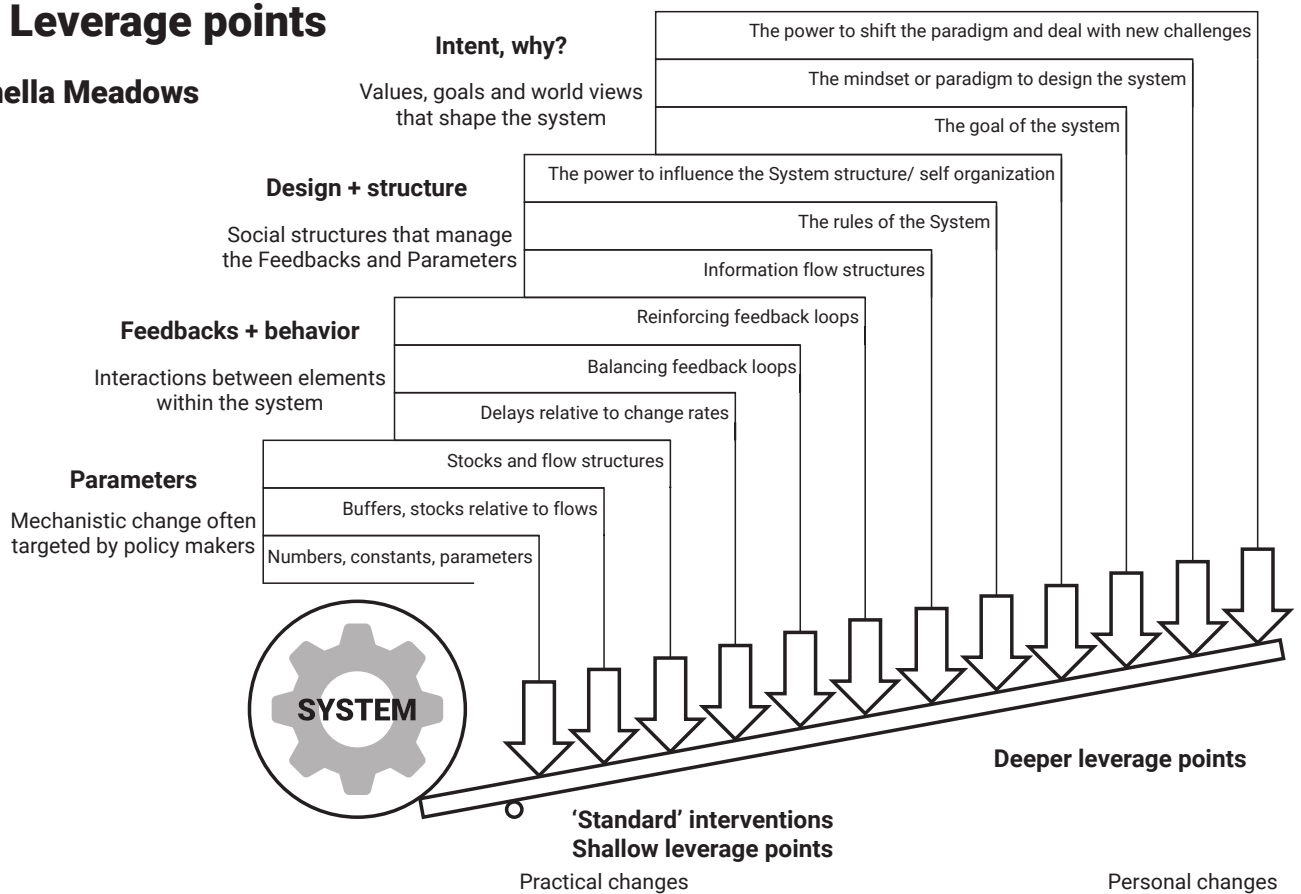
Visibility and communication

The waste stream is invisible; once materials enter the collection point, they disappear from consciousness. Make a system that shows the benefits of recycling and feedback systems to show people the good that they are responsible for by engaging with the system.

6.2 - LEVERAGE

System intervention 12 Leverage points

Donella Meadows



How can we have the biggest impact on the system?

We chose to focus on the higher leverage points in Donella Meadows System interaction leverage points, exploring the visions and goals that shape the system and how to change the power dynamics within the system.

6.3 - IDEATION

People don't seem to be able to sort their garbage at home - so the question is, should they?

The systems surrounding waste are so complex that trying to control people's behaviour is unlikely to yield positive results, new challenges are constantly emerging. Energy might be better spent studying those behaviours, learning from them and designing around them, incorporating them into the system in a beneficial way.

Collective action

If the vision of REG is compelling and inclusive enough, it could encourage commitment from the stakeholders with which it interacts. Co-ordinated collective action can help create social cohesion, establishing trust through honesty and transparency

Connection to consumers.

People need ways that they can influence the systems in which they participate. We could create more structured ways for the consumer to talk with the recycler and the producers. A neutral digital feedback platform where customers can air frustrations, co-create solutions and share positive news and information.

Compounding improvements.

With a focus on simplicity and scalability, REG could build on the existing infrastructure tweaking the system towards more user-friendly systems. With a unified goal throughout the organisation, a constant focus on minor course adjustments could compound over time to deliver significant impacts.

Choice architecture.

Even the most demotivated individuals have to recycle and inadequate behaviour damages the work of others. What if people could opt-in to the amount of recycling that matches their level of engagement. Sorting could be encouraged through gamification, helping areas to improve behaviour by showing them their localised results. Areas that fare poorly can be focussed on in different ways, perhaps paying more for their waste services.

Exploring new narratives.

What if we could eat our packaging or flush it down the toilet? How would this impact the system? What if we could reuse our packaging without the need for material recycling? What if we could establish all of the critical stakeholders related to waste as owners of a closed-loop system from production to disposal in a similar way to Tomra's pant system could increase efficiency?

Material banks.

Direct community engagement could connect material systems with local creative organisations, supplying them with resources. Materials could be manually sorted locally by volunteers, and useful items returned to the community before the waste continues to the sorting system.

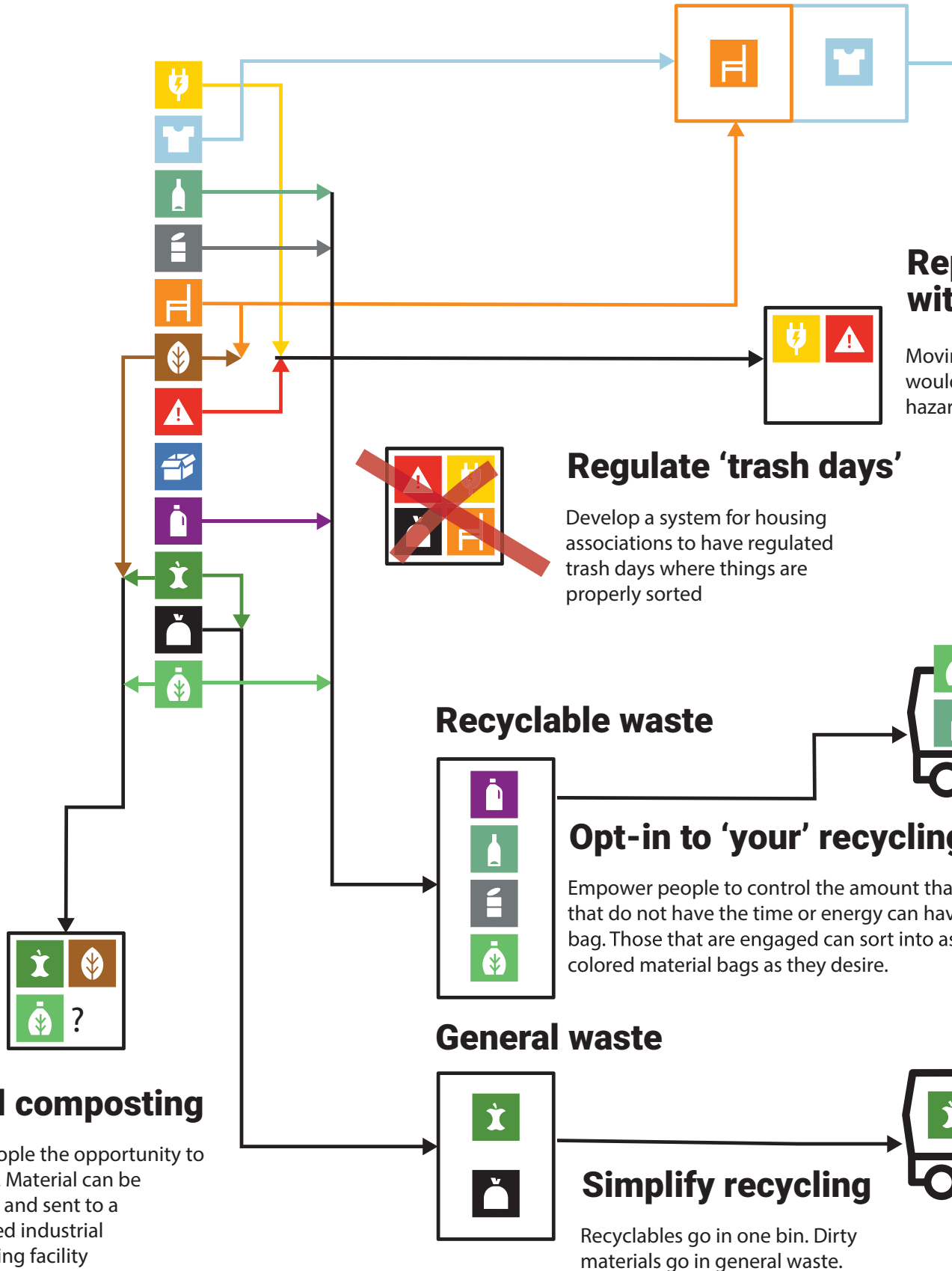
Transparent recycling journeys.

Could the journey of materials to recycling and back to production be tracked with blockchain technology to ensure that the materials that people think are being responsibly recycled can be tracked and verified? Part of the issue with recycling is the logistics of tracking materials as they pass hands and get lost in flows. If you could set up a secure system that follows the flow of materials you could increase the accountability of the actors and more easily see flaws and weaknesses in the system.

Structural changes to the system

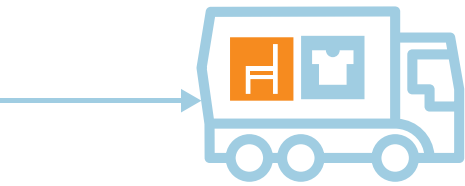
Clothing and objects

Open up clothing collection so new lives locally. Add a container where people can help themselves to functioning items.



ject libraries

that items can have
er for objects of use
lives to unwanted



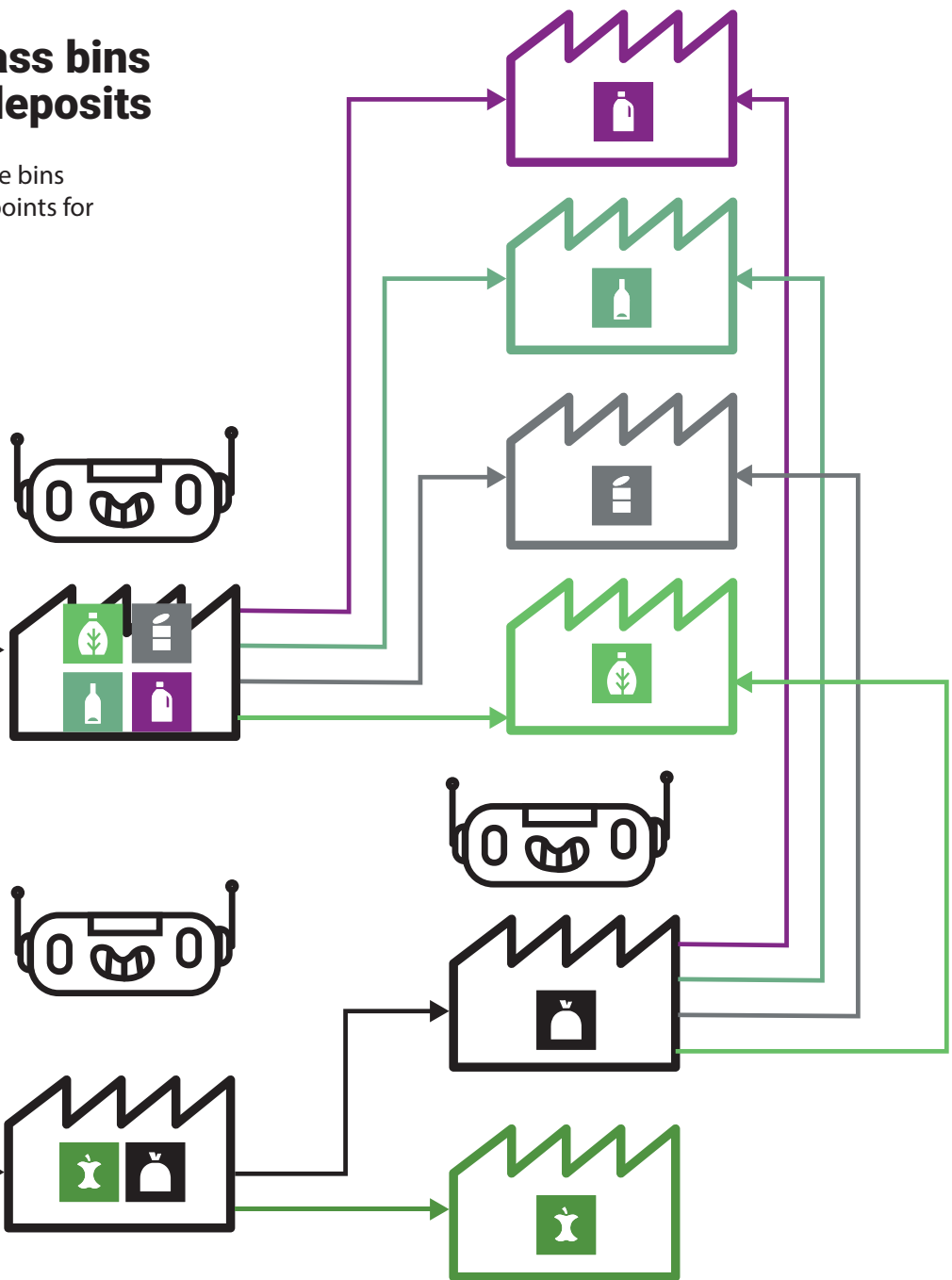
place metal and glass bins h awkward waste deposits

ng the glass and metal to the home bins
d free up the space for collection points for
rdous waste and electronics



g system

t they sort. Those
ve a single 'recycling'
s many different



Build on the existing infrastructure

Home sorting and colored bags should be the first stage of the sorting process. General waste ought to be scoured for recyclables to catch any materials that have been incorrectly sorted before incineration.

6.4 - VISION

Recycling is not the goal

There is no reason that recyclability need be the only focus, we aim to encourage re-design, re-use and reduction of materials, keeping materials as high up the waste pyramid as possible for as long as possible.

Depending on how you measure it recycling can seem like a waste of energy. By some metrics a canvas bag can be seen as the worse choice, since the energy needed to produce it is equivalent to that needed to make a thousand plastic bags. This equation only works though if energy is the most important factor and brushes over the potential impact of the majority of those 1000 plastic bags polluting the natural environment, ending in landfill or being incinerated. The cost of energy spent now might seem high, but the cost of abstract future costs of climate instability and bio-diversity loss if we continue with a disposable society will be higher.

Sustainability as a goal is aiming for the bare minimum needed not to fail. A company does not strive for mere financial sustainability but seeks a net positive result. The purpose of a system ought to be to surpass sustainability and aim for thriving systems.

You can imagine a world where all packaging is infinitely reusable and recyclable and produced in harmony with natural systems. The waste system could be responsible for the repurposing of these materials, but it would still need to have the capacity to dismantle legacy products. There is even the potential in the future to sift through the landfill and litter of previous generations, recovering precious lost materials, this makes incinerating of waste seem like a short-sighted solution.

Improve the products

There are a certain amount of products that through poor design will be wrongly sorted and contaminate the recycling process. These products need to be found and either; removed from circulation, re-designed to fit the recycling system, or accommodated by the recycling system.

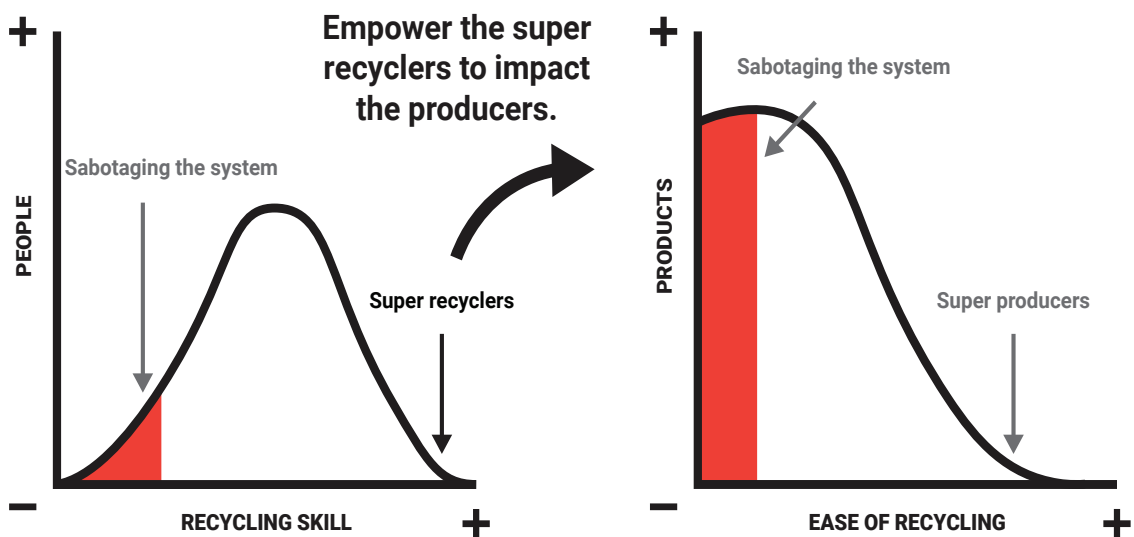
The products that are entering the system are constantly changing. There need to be feedback loops in place to capture these changes and accommodate for them. The entire system from extraction to disposal needs to be in flux, reacting to change, improving and adapting and continuously improving.

Reduce the chance of error

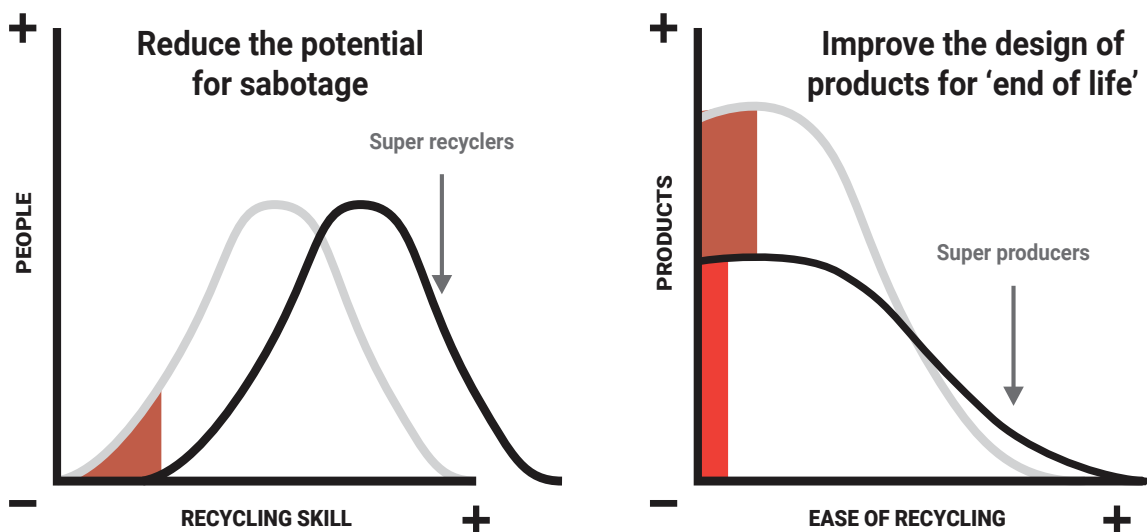
There are a certain amount of people that are unwilling to participate in recycling at all, either through ignorance, apathy or any other reasons. These people are currently able to do a lot of damage in a system wholly reliant on the acts of the individual. There is another group at the other end of the spectrum that is incredibly interested in 'doing the right thing'. Our concept aims to allow these individuals to use their passion and energy to improve the system so that those that are currently unengaged are unable to do the same damage that they currently are able to do.

Can we empower the super recyclers to nudge producers into better design habits?

From this:



To this:



7.0 - PRODUCT CONCEPT

Crowd-sourcing future proof products

7.1 - END THE WAR

7.2 - REGENERATIV

7.3 - EXAMPLES

7.4 - RE-BALANCING

7.5 - RANKING

7.6 - BUSINESS MODEL

CANVAS

7.1 - END THE WAR

“It can’t be a matter of persuading more than half of American society to make economic sacrifices, it’s much more along the lines of just building cars and other products that are carbon neutral that people want and solving the problem that way”.

- (Harris, Sam. 2020)

With our current behaviour, humanity is destroying the ecosystems that we depend on to survive. How can we tip the balance towards more sustainable behaviour in harmony with nature and then beyond that to regenerative systems that benefit the planet?

Looking at the leverage points within the system we saw a potential in the area of consumer engagement and connectivity. Information about what can be recycled where is available but it is not connected to the products people buy.

The waste system is a linear system attempting to bend itself towards circularity. The first hurdles that materials need to traverse to return to the loop start at the production phase. Producers are not held accountable for the things they create and people don't have all of the information needed to make informed purchasing or disposal decisions.

We designed a digital platform to encourage an ecosystem of intentionally designed products that can help steer the waste system towards sustainability and from there towards regenerative systems.

“fighting the enemy is futile when you inhabit a system that has the endless generation of enemies built into it. That is a recipe for endless war.” (Eisenstein, Charles, 2018)

We decided to take the fight to the ones that are producing the enemies of the waste management system.

7.2 - REGENERATIV

“Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it’s the only thing that ever has.”

- Margaret Mead (Keys, Donald. 1981)

The basic concept is a crowd-sourced platform that allows consumers to air their confusion, annoyance or love for the products that they come into contact with. This feedback will trickle down to create a rating system for individual items, that amalgamates into a rating for the producer, retailer and parent company. The consumers can be pointed towards better alternatives that are available for the products that score poorly and producers and retailers can measure how people think of their products.

We aim to engage people through their inherent self-interest in changing the system, empowering them through collaboration to encourage more desirable products that do the least harm to our shared environment.

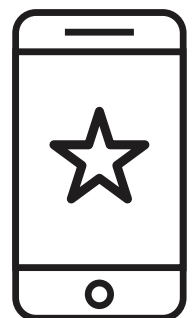
Our intent is to collect the individuals from the active end of the 'environmentally and ethically engaged' bell curve of society, and industry experts, and allow them to use their passion to feedback directly to the industry and one another, keeping the data safe in a neutral third party location. The plan is not to get disinterested people engaged in the platform or to encourage them to buy different products directly, but to change their shopping behaviour unconsciously by helping producers to improve the available options, altering the market through the actions of the engaged minority.

The average person is not an expert, but their opinions are still valid. Their opinions can be contrasted with those of experts to generate interesting insights.

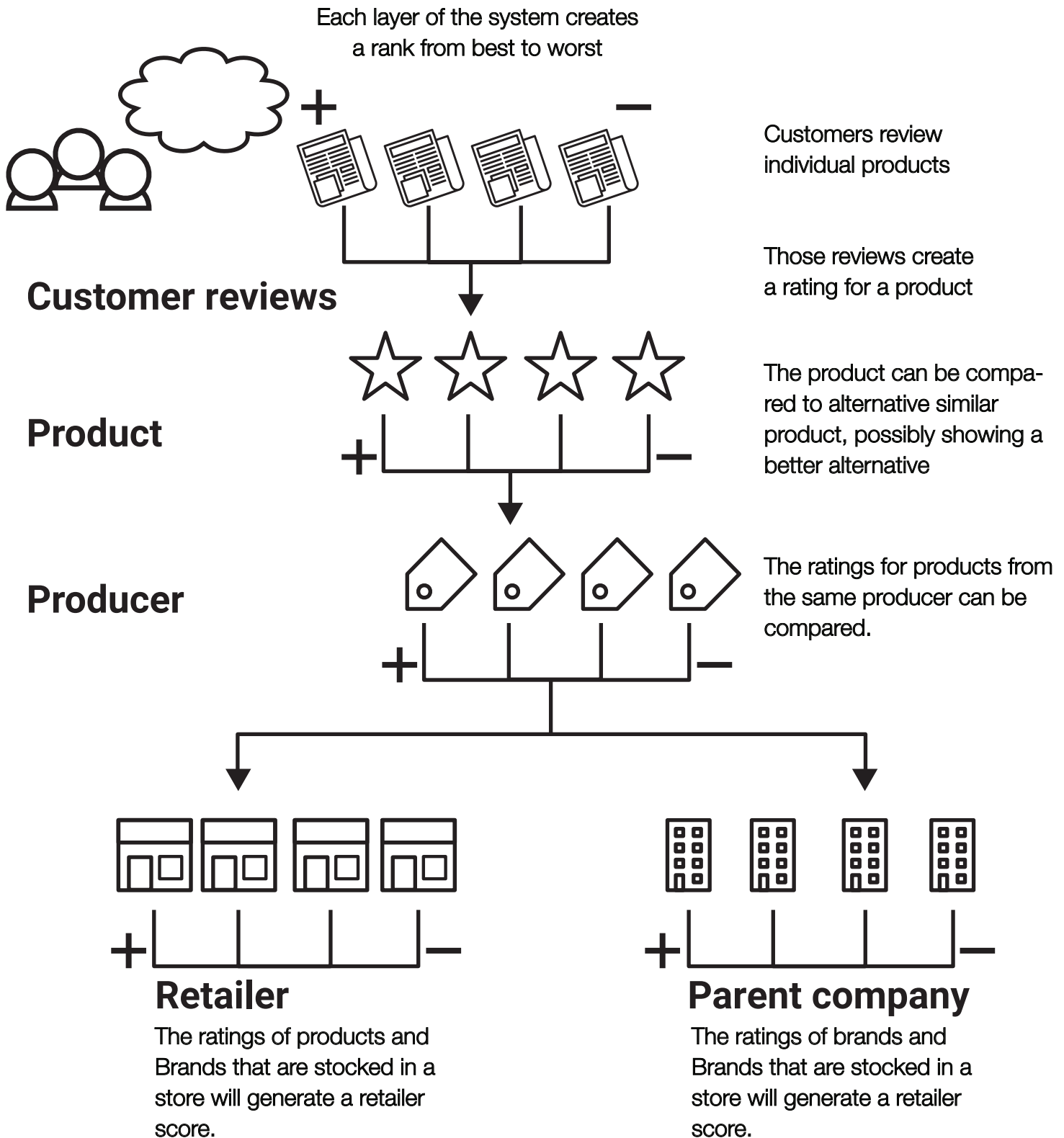
Sign in to the community



Add products, write reviews, rate, upvote and comment



The Goal: Getting customer experiences and insight back to the producers and recycling system



Encourage competition to deliver the best solutions

1. Regenerativ - a neutral space to review products

The core concept is collecting lived experiences and allowing them to feedback to the producers and those that deal with waste.

These crowd-sourced experiences create a ranking system of objects that trickles down to rate, brands, retailers, and parent companies. Frustrations and innovations can be linked directly to those responsible for them, and with the power to influence them.

If brands, retailers, or parent companies want their rank to increase, they will need to drop products and brands that are negatively impacting their rating, and the information of what is wrong with the products will be available.

The ranking focuses on ranking products based on their design, but can also incorporate feelings and experiences. The platform could further expand to form a more holistic 'ethical' design index as long as the information collected is available to the consumer.

2. Mapping recycling systems

2. The platform can be a host for waste management systems, allowing them to link to their users, share their systems, and explain what gets recycled where, this can help consumers to buy the products that can be dealt with by the waste management system that they have. Recycling systems could be ranked in a similar way to products, based on what materials they are able to deal with.

3. Hosting experts

The platform could be expanded to include the opinions of experts. There those with the inside knowledge could shine a spotlight on the positive things that happen backstage in the production, retail, and waste management process that are mostly invisible to the consumer.

4. Storing pledges

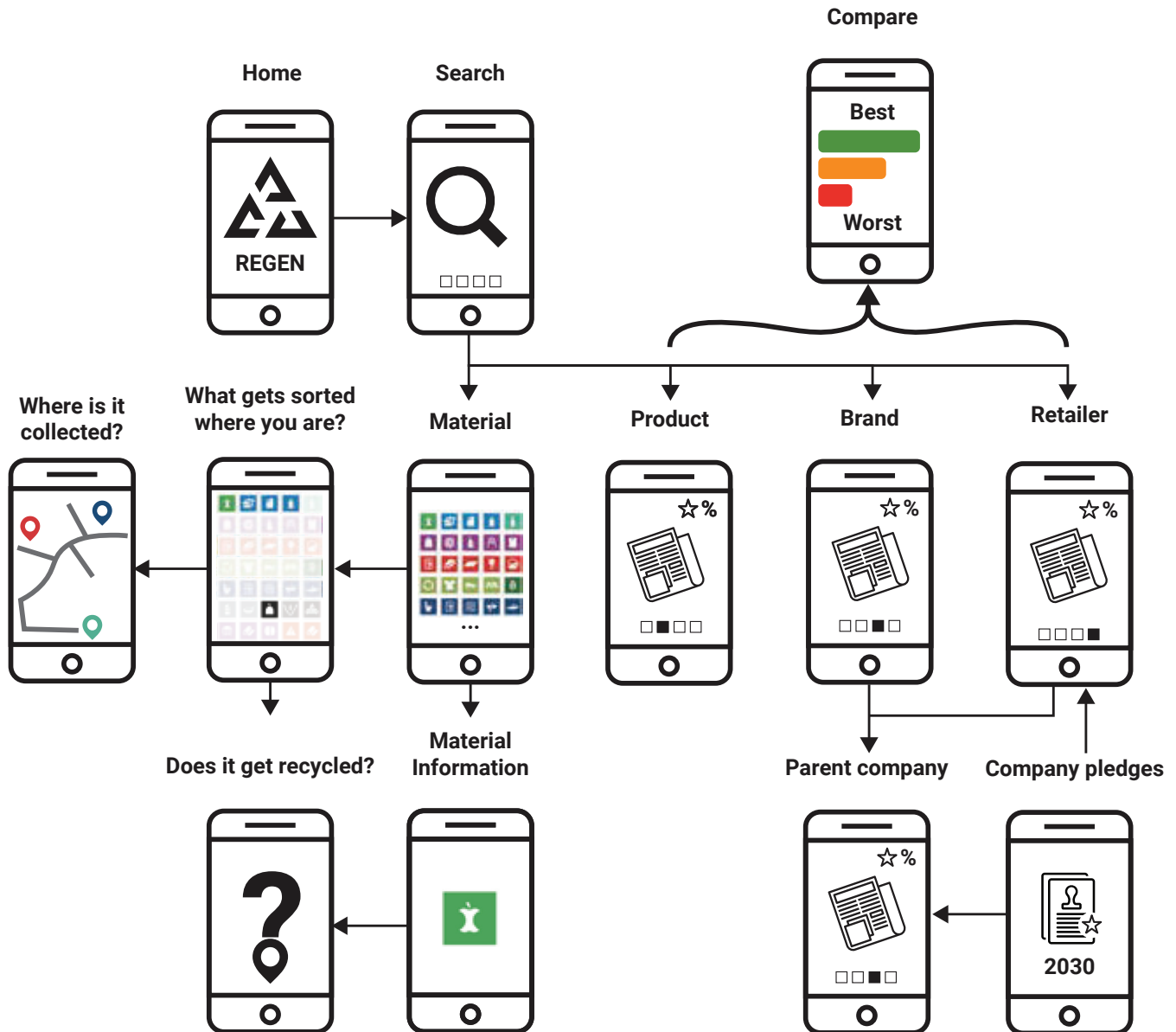
The site could also be expanded to host pledges that have been made by companies. Holding companies accountable for the promises that they make. Companies rankings can be impacted by what they do compared to what they say they will do. This could combat the ease of promising lofty greenwashing goals that give good publicity in the short-term and are rarely achieved.

Sharing information

Information will be open. If you are curious about a product or brand you can view open pages to help you form an opinion based on other peoples experiences

Ratings trickle up

The ratings of individual products build up to create an additional rating for the brand, retailer and parent companies. These can be easily compared.



Hosting

Local waste collection systems can be hosted on the site, rather than being on a thousand independent websites. Information of what goes where and how it is dealt with can be shared with the public.

Accountability

Company pledges can be added to their pages and stored for later review. If they do not hold up their promises, then this can impact their future ratings.

7.3 EXAMPLES

Here is a collection of the kind of products that users are expected to try and sort for recycling. Thousands of individuals are struggling with the same products every week, one person posting a review could nudge the producers to do something about it, save everyone a lot of small stresses and make the world a little bit better at the same time.



Gluten free Museli
 Producer: AXA
 Retailer: Coop

"The package is a mix of plastic and paper, unrecyclable"



Chorizo
 Producer: grilstad
 Retailer: Coop

"The package is made of a mix of paper and plastic, the labels tells me I can recycle it as plastic, this seems wrong"



Organic baked beans
 Producer: ånglemærk
 Retailer: Coop

"The box is paper and metal laminate, it's cheaper and weighs less than a tin, but is not recyclable"



Edamame beans
 Retailer: Coop

"A mix of plastic and foil, unrecyclable"



Tomato package
 Retailer: Coop

"The sticker doesn't peel off. Would this ruin the plastic recycling process?"



Yoghurt
 Producer: Q

"This isn't recyclable. Why does it have the green dot logo?"



Chocolate milk
Retailer: Schools
Producer: Tine

"The bottle says it can be recycled as paper but the top is fused with plastic. It's confusing so I throw it in the mixed waste"



Organic coffee
Producer: Kaffehuset Det Gyldne bønne

"This is made of mixed materials and cannot be recycled. It looks good when you buy it, as though it was made of recycled paper"



Solsikkerbrød
Producer: mesterbakeren

"The plastic and paper are a pain to separate, I end up with crumbs all over the place. Make it out of paper like everyone else!"



Plastic bag
Retailer: Volt

"I bought a shirt and the seller told me that the bag was compostable, so I could just throw it away wherever and it would turn into soil. I assume that it would need an industrial composter and I don't think there is anywhere in Norway does that kind of recycling. Can I throw this away in plastic recycling? I read that bio-plastic can damage regular plastic fractions"



Roast nuts
Retailer: Coop
Producer: Den lille nøttefabriken
Parent co: Brynildgruppen AS

"I bought two different packets if nuts from the same company, they look the same but only one of them says it can be recycled as plastic. It seems to be a laminate of paper and plastic, so I doubt that this is correct"



Medicine tray
Producer: KRKA

"There must be a better alternative to this design. It is impossible to separate the two parts, both of which should be easily recyclable"

7.4 - RE-BALANCING

Crowd-sourcing accountability - Holding waste systems, producers and retailers accountable.

The ranking system is inspired by the ethical banking guide in Norway that encourages better investing behaviour in banks through creating transparent competition of openly measured parameters. There may be companies that are not interested in such a ranking list, but perhaps the retailers that stock their goods, or the parent companies will dislike the harmful exposure and be forced to distance themselves or rethink their practices.

The platform works in a similar way to the movie review site 'Rotten Tomatoes'. Just as people can choose to watch a film with a high rank, people can choose which products to buy and help to raise awareness of which brands are designing intentionally, and those that are not, whilst simultaneously leaving useful customer feedback to help to better align products with user desires.

Companies listen when a large enough voice is raised on social media platforms. This volume is hard to achieve when individuals are reacting on separate platforms, especially when those platforms are under the control of the companies that people want to change.

Regenerative could share information to the social media platforms of companies, linking them to the ideas and solutions generated by users.



7.5 - RANKING

Regenerativ collects customers frustrations, insights, desires and ideas, allowing them to view other peoples reviews anonymously or join in the debate and 'upvote' and comment on statements on which they agree. Engagement can be encouraged through gamifying interaction with the platform, rewarding those that are active with status within the community.

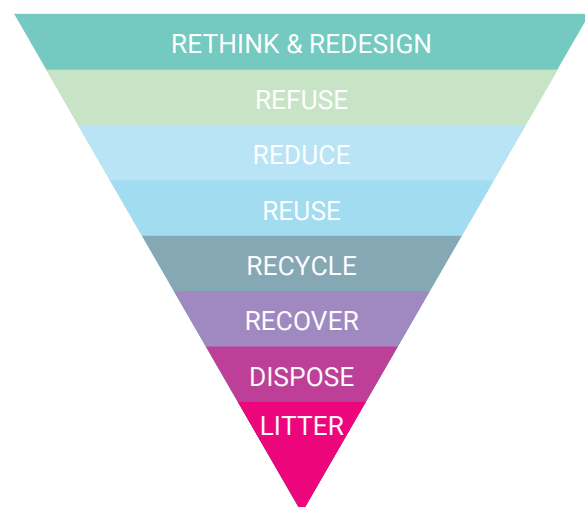
People can add products by uploading a photo and linking it to the producer and retailer. Products can be rated using simple tick boxes of choices on different themes, with users receiving points the more they contribute.

The platform could be even be populated parasitically by collecting popular products from websites.

Some examples of questions that users could answer to generate the rating,

When it comes to disposability:

- Have you seen a better alternative to this?
- Does it need the packaging?
- Could there be less packaging?
- Can you re-use the packaging?
- Is it clearly labelled how to dispose of it?
- Is it obvious what material it is made of?
- Are there mixed materials?
 - If yes, are they easy to separate?
- Is it recyclable?
- Is it easy to dispose of cleanly?
- Would it decompose in nature?



Other themes can be added as the platform develops but they will need to be answerable with the knowledge available to the consumer.

Experts from within the industry or those that have contributed a lot to the platform could have access to more indepth questions that provide more holistic information.

7.6 - BUSINESS



Business Model Canvas

Key Activities

Information sharing



Collecting user feedback and experiences

Storing company promises

Value Proposition

Value offered to

Transparency

Collecting and sharing information

Holding promises and recycling accounts

Neutrality

Showcasing alternative

Showing producers and customers

Partners



REG

Loop

Other counties recycling services

Sortere.no

Grønt punkt

Tomra

Key Resources

Customers (Super-users)



Experts

Government

Producers

Cost

Necessary costs

Designing the platform

Maintaining the platform

Promoting engagement

Combatting abuse of the platform



MODEL CANVAS

Regen

Proposition



Agency

g and

on

producers

elers

ble

y

ing better
es

s what
s value

Customer Relationships

A Digital
community



Comment, vote,
review, add.

Educational

Channels

Networking
existing channels,
Link fragmented
data globally.



Customer Segments

Eager



Zero-waste

Minimalist

Environmentalist

Activist

Experts

Revenue

Existing sources of revenue

NGO

Not-for-profit

Government subsidies
/ funds for circular
development

Subscription for
companies. Analytics?



8.0 - CONCLUSION

8.1 - FEEDBACK

8.2 - DISCUSSION

8.3 - IMPLEMENTATION

8.4 - SCALING UP

8.5 - FURTHER STUDY

8.1 - FEEDBACK

Critique to address

Johannes Daae from Grønt Punkt Norge was kind enough to give us some feedback on our early concept. His insight enabled us to rethink some aspects of our concept including questioning whether recycling ought to be the desired solution in the first place.

His feedback made us question:

- What it is that producers need to know in order to create increasingly better products?
- What is needed in order to change the behaviour of people and producers?
- How do you create a visually intuitive rating system for different products?
- How do you show producers the benefits of designing products that circular systems?

There are a lot more issues that we need to discuss to see if the concept is viable. The general consensus when we have pitched the concept to people has been positive, with the main idea being easily understood and the more enthusiastic individuals seeing value in having a platform to vent bad experiences or search for alternatives.

There are still many issues that would have to be considered.

- How do you stop companies from adding trolls or bots to skew the results in their favour?
- How do you limit fake news, or mis-information? People are not experts and incorrect information can be amplified if it is told in an engaging way.

8.2 - DISCUSSION

Recycling is no longer enough. We have changed the focus to being more holistic and aim for innovative and regenerative products rather than just recyclable.

There is nothing stopping producers from making lofty promises, which they later break when no one is holding them accountable. Part of a products rating could stem from it's brands history of keeping promises. It could store a history of a companies goals and give a score based on how much they achieve that they say that they intend to.

We also attempt to combat the fact that a parent company can own both the cheap poorly designed product and it's expensive well designed alternative, where boycotting the poor product achieves nothing. Having the ratings trickle down to impact the brand, retailer and parent companies is a way to impact the system at a higher scale.

A producer exists because they give people what they want or need. People have had no reason to prioritize an item's recyclability or ethical merits when deciding what to buy. For most consumers other criteria like price and brand take precedence. It is not that people do not care, it's that they do not have the time, energy or even the option to be careful in their busy lives full of things more important than the plastic wrapper afterthought.

We want to encourage a race to the top with companies and retailers competing to create the best products they are able to. Utilising those that are able to care to create a shift in producer and retailer behaviour.

Most producers need more than just feedback and advice to make changes. At the industry workshop that we attended at Sintef some producers called out for virgin plastic to be taxed to encourage recycled plastic as a valid option.

For Regenerativ to succeed it will have to reach a critical mass where enough people follow it and use it, for it to have an impact on the actions of producers. In a world of apps and distractions the challenge will be to entice people into engaging with the system. If the platform can generate enough user engagement to hit a tipping point and create visible change then there is no reason that it cant be scaled to function in any country for any product.

8.3 - IMPLEMENTATION

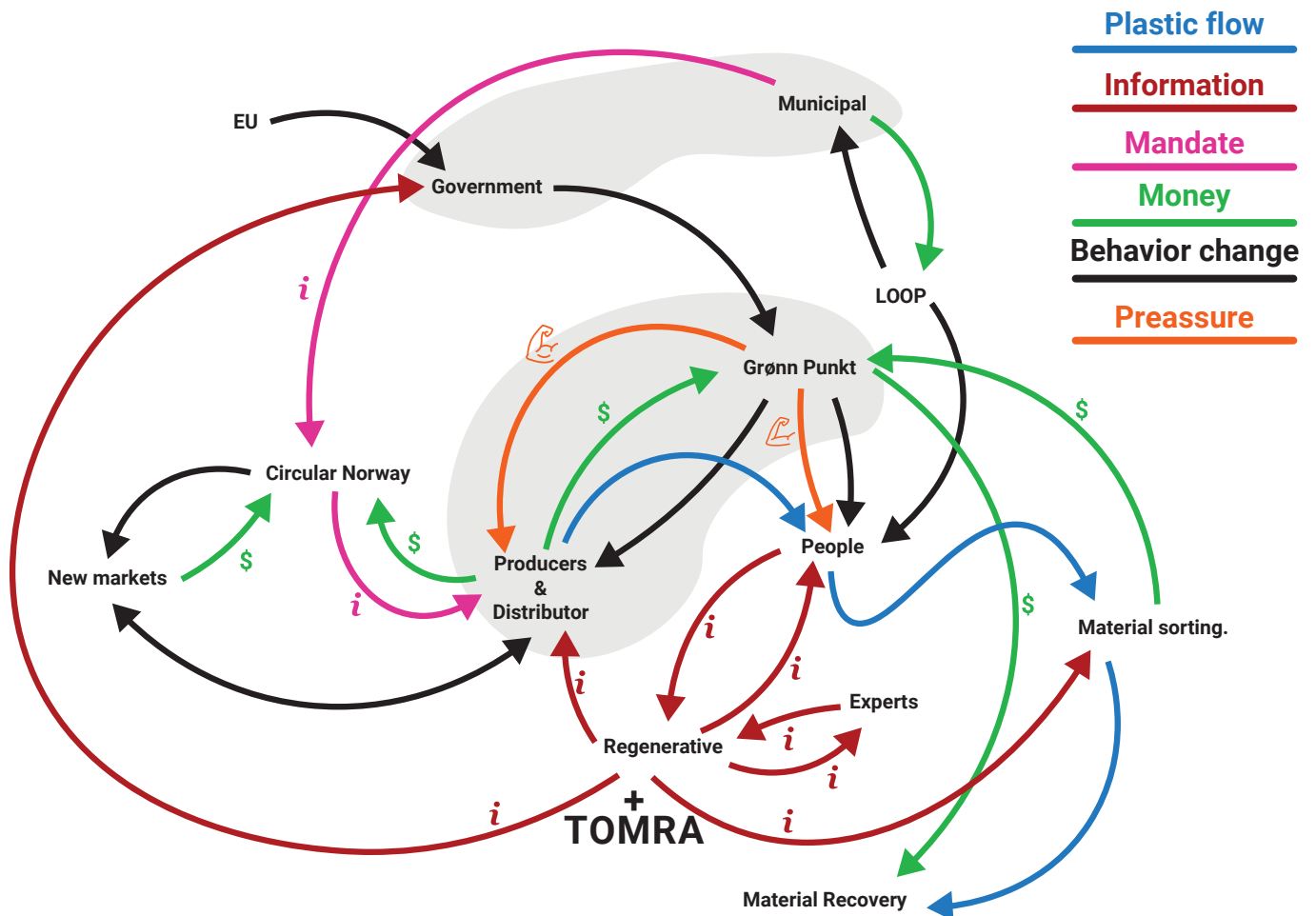
So who should we work with? Who would benefits from this platform?

We believe that the platform would generate value for the users and the planet, but people are unlikely to want to pay to review products and the planet doesn't have pockets to keep a wallet in.

So who could own the platform and get value out of it?

REG doesn't have the budget and is limited in scope. Grønt punkt is too tightly connected to the producers.

We decided to reach out to Tomra. They are a global company with roots in Norway dealing with the collection, recycling and processing of materials. They work at a global scale and their values align perfectly with the vision of Regenerative. We reached out to them through their social media and pitched the idea to them and as of writing, we are waiting on their response.



8.4 - SCALING UP

We believe that the platform could start small and local focussing on Oslo and scaling up to encompass the whole of Norway. There is no reason that it could'nt be scaled up to encompass, Skandinavia, Europe, and eventually the rest of the world.

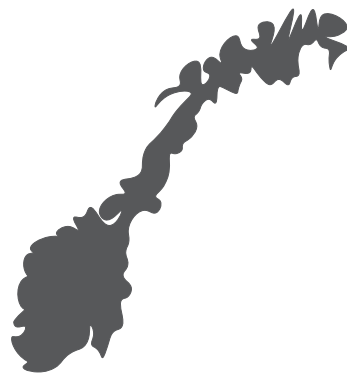
The platform can begin by focussing on plastic waste and encouraging the correct disposal of materials, expanding to encompass all household waste.

There is no reason that it couldn't expand to include ethical product design in different areas, encouraging ecologically sound practice, human rights, equality, eventually becoming a global ethical design index.

Oslo



Norway



Skandinavia



Europe



And then the world!

8.5 - FURTHER STUDY

Hedonistic sustainability

If we are going to change the world for the better within existing systems we need to make doing good the best option. Until we find a better system, we are forced to work with what we have. Many of the limitations that we came up against during this project were based around the fact that doing the right thing tends to cost more than doing the profitable thing. How do you sell sustainability?

A focus on retail

Household waste constitutes around 10% of a country's waste stream, with most of that waste coming from retail. There is no incentive for retailers to recycle their waste if it costs more than alternative methods of disposal. It would be interesting to explore how much waste disposed of by the retail industry is rinsed and correctly sorted.

Looking elsewhere

What is happening elsewhere that Norway should be looking to? What novel ideas and solutions are being hidden behind a language barrier that the world ought to know about?

Local composting

Encouraging the creation of biomass, Norway has very little arable land, increasing levels of soil depletion, few export crops and a lot of imported food. Turning that food waste into nutrients would be an interesting area to explore.

Dog poop

In Oslo there are 20,000 dogs most of their waste is collected in plastic bags and thrown in bins. There is a rich source of nutrients if that could be efficiently collected and composted in a different way.

9.0 - APPENDIX

Other areas of interest and further depth.

9.1 - DROPPED ACTOR

9.2 - PRIORITISATION

9.3 - A DISLOCATED

SYSTEM

9.4 - LEVERAGE POINTS

9.5 - SYSTEM

ARCHITECTURE

9.6 - POLICY GOALS

9.1 - DROPPED ACTOR



HALDEN KOMMUNE

We were put into contact with Kåre Svein Edvardsen by Johannes Daae as he was interested in researching the reasons behind people reported behavior. We explored the idea of testing psychological nudges on users as they interact with bins, however we ended up taking our project in a different direction.

”According to our research the worst recyclers are white males in their late thirties that vote for FRP”
-Kåre Svein Edvardsen



An early concept exploring nudging users.

9.2 - PRIORITISATION

It is possible to rank potential solutions to the climate crisis by their potential to reduce the levels of carbon in the atmosphere, this is what Project drawdown attempts to do (Hawken, 2017).

Food waste #3

Roughly a third of the world's food doesn't get eaten, which means land and resources used and greenhouse gases emitted in producing it were unnecessary. Interventions can reduce loss and waste, as food moves from farm to fork, thereby reducing overall demand.

Bioplastic #47

Globally, we produce roughly 310 million tons of plastic each year. Almost all of it is petro-plastic, made from fossil fuels. Experts, however, estimate that 90% of plastic could be derived from plants instead. Bio-based plastics come from the earth, and those that are biodegradable can return to it often with lower carbon emissions. The big challenge for bioplastics is separation from other waste and appropriate processing. Otherwise, they do not fulfil their promise as more sustainable materials.

Recycling #55

Project drawdowns suggested solutions to improving recycling:

- Fees for landfill waste, while recycling and composting are free;
- Redeemable deposits paid at purchase (from bottles to electronics); and
- Programs that gather funds from manufacturers to cover recycling costs.
- Extended producer responsibility laws make companies responsible for managing goods post-use—an incentive to create products that are longer-lasting, easier to fix, and as recyclable as possible.
- Marketplaces for secondary materials facilitate the exchange of recyclable and reusable goods.
- Innovation in conversion technologies makes more materials recyclable.
- Circular business models transform the dominant industrial approach of take, make, waste—recapturing “waste” as a valuable resource.

Composting #60

Nearly half of the solid waste produced globally is organic or biodegradable. Much of it ends up in landfills; there, it decomposes in the absence of oxygen and produces the greenhouse gas methane, which is up to 34 times more potent than carbon dioxide over a century.

Copenhagen, Denmark, has not sent organic waste to landfill in more than twenty-five years, reaping compost’s win-win-win of cost savings, fertilizer production, and reduced emissions.

Methane digesters #64

Industrial-scale anaerobic digesters control the decomposition of organic waste, and convert methane emissions into biogas, an alternative fuel, and digestate, a nutrient-rich fertilizer.

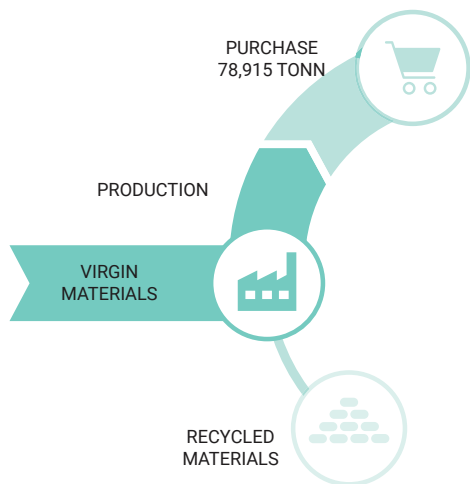
Waste to energy #68

Waste-to-energy processes (incineration, gasification, pyrolysis) combust waste and convert it to heat and/or electricity. Emissions reductions come with health and environmental risks, however.

Paper recycling #70

A particular piece of paper can be reprocessed roughly five to seven times, before fibers are no longer viable. In addition to curbing emissions, recycled paper spares forests and reduces water use.

9.3- A DISLOCATED



Producers - packaging industry

There is a fear of change, the status-quo is profitable.

Externalizing costs where possible is economically sensible. Production has very little waste, inefficiency is not profitable, waste occurs once products leave the 'gate' and enter the market.

The guiding forces are profits and to a smaller extent market forces. In a small market they have a lot of control over customer options.

The designer

Companies need to be investing time and money in doing it right at every stage of the material journey.



Grønt punkt

Green dot labelling is optional.

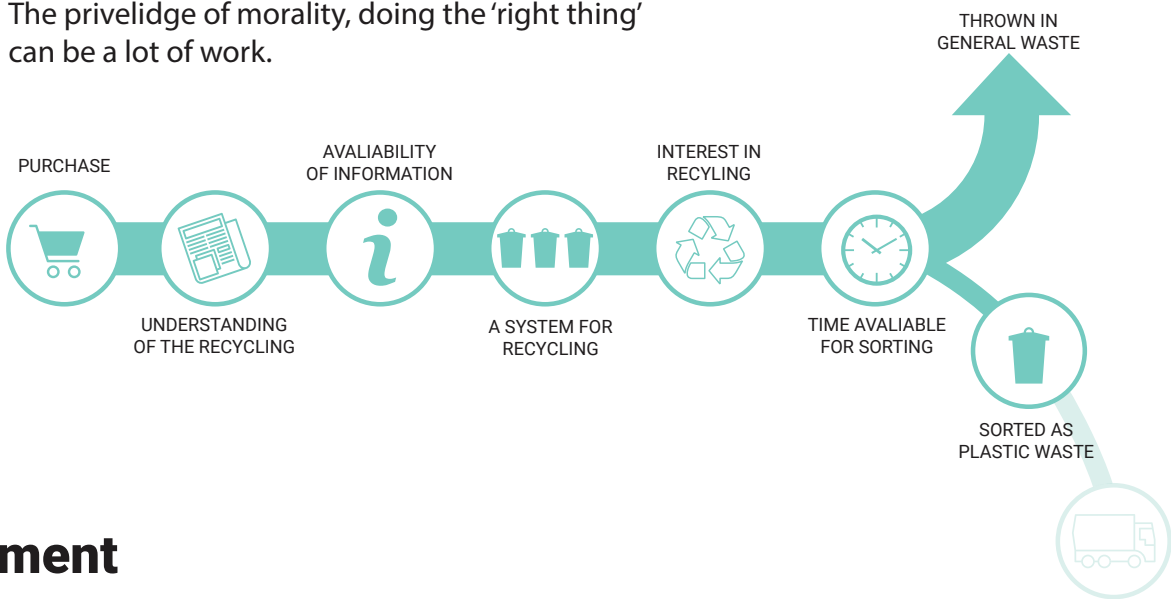
There is overlap and underlap within the system.

Competition reduces their impact on the system, traditionally competition should be beneficial in a market.

SYSTEM

The user

The privilege of morality, doing the 'right thing' can be a lot of work.



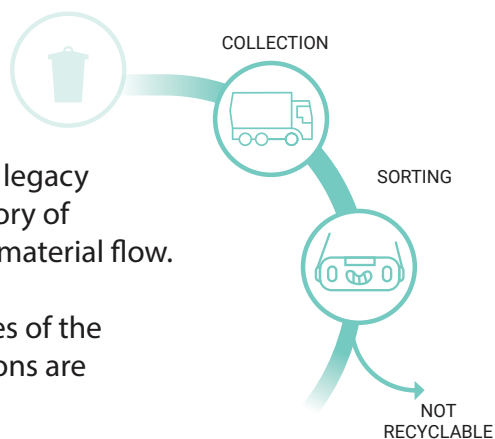
the government

goal of economic growth
increasing GDP. Political
competition for power over
short 4 year periods can work
against long-term goals.

Renevasjonsetaten

REG is working with limited budgets, legacy systems, dealing with a complex history of materials and a constantly changing material flow.

They deal with the unprofitable stages of the material system, any profitable fractions are collected privately



9.4- LEVERAGE POINTS

Problem

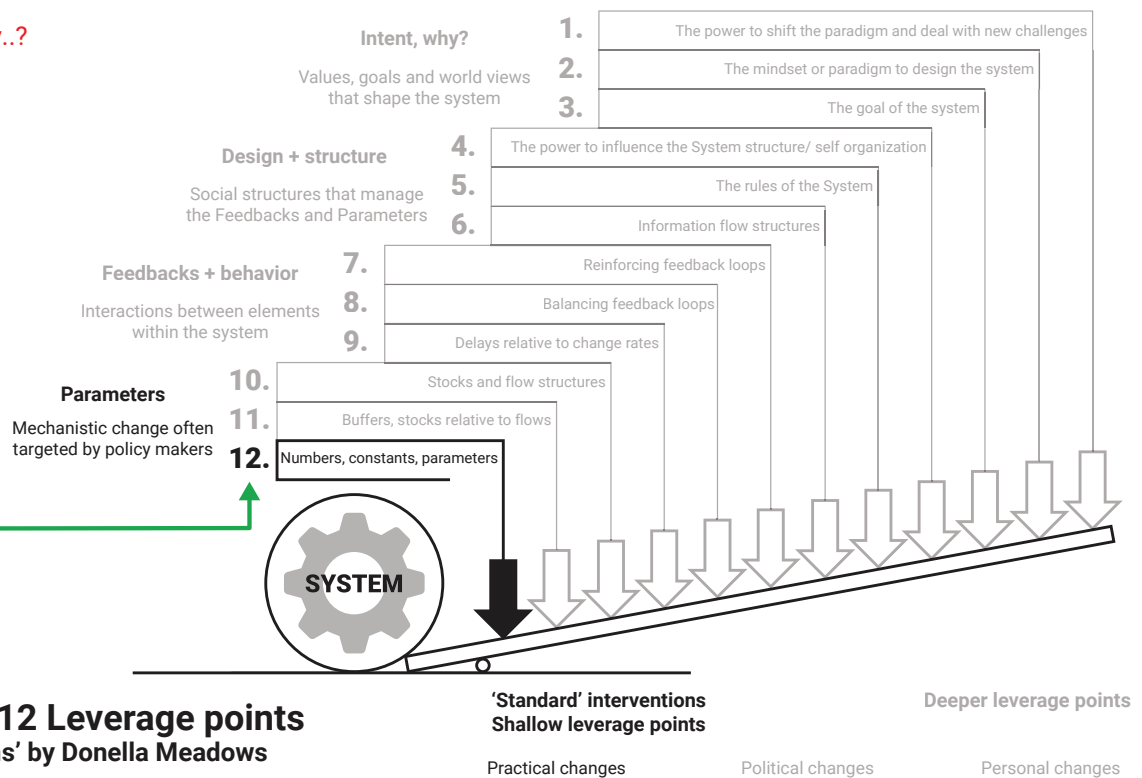
People dont seem to be able to sort their recyclable materials correctly at home

Should they..?

Proposed solution

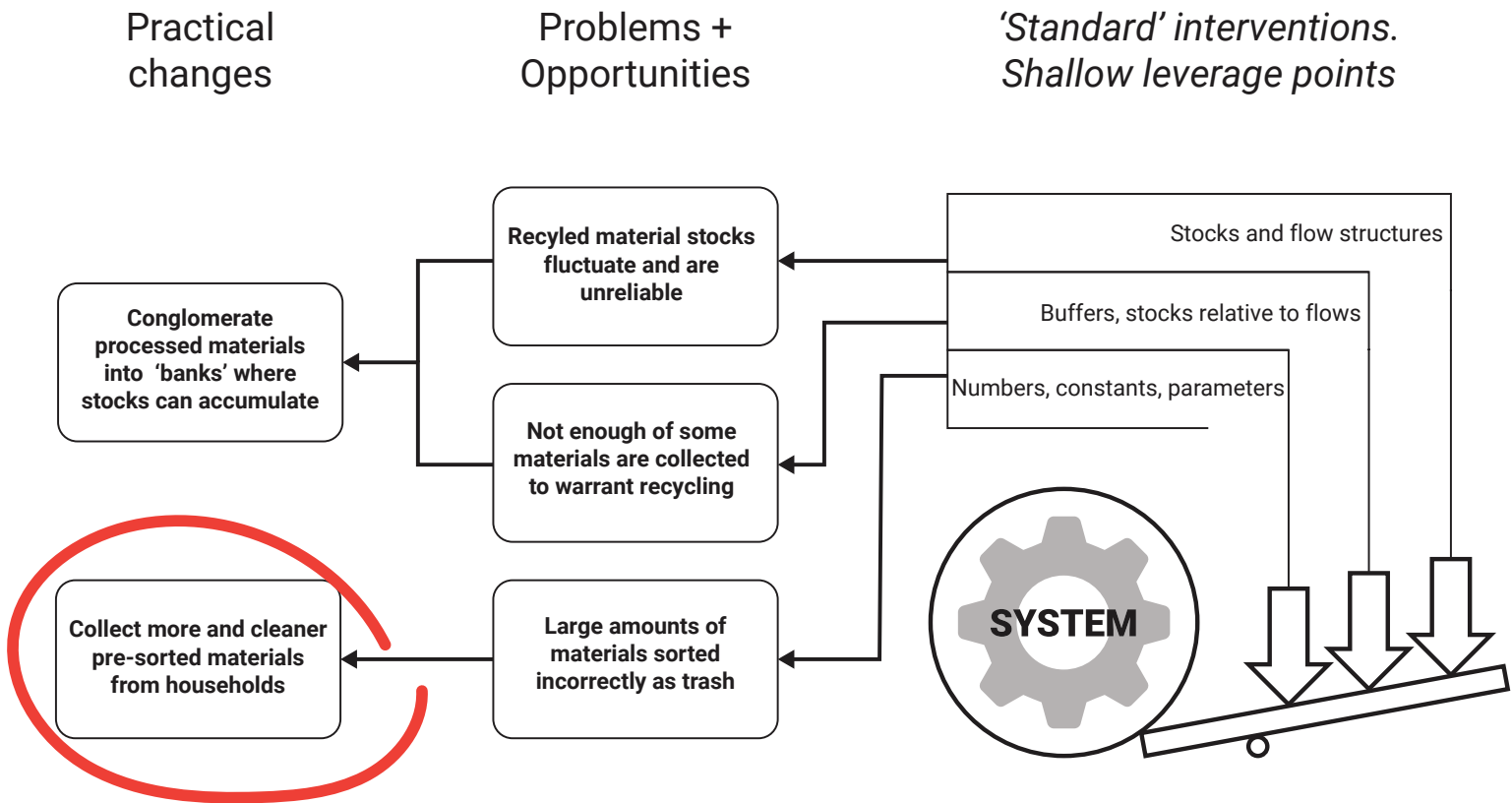
Nudge people to sort more and cleaner material percentages

Alternative levels of leverage points to explore that can have systemic impacts:



System intervention - 12 Leverage points
Inspired by 'Thinking in systems' by Donella Meadows

Parameters - Mechanistic change often targeted by policy makers

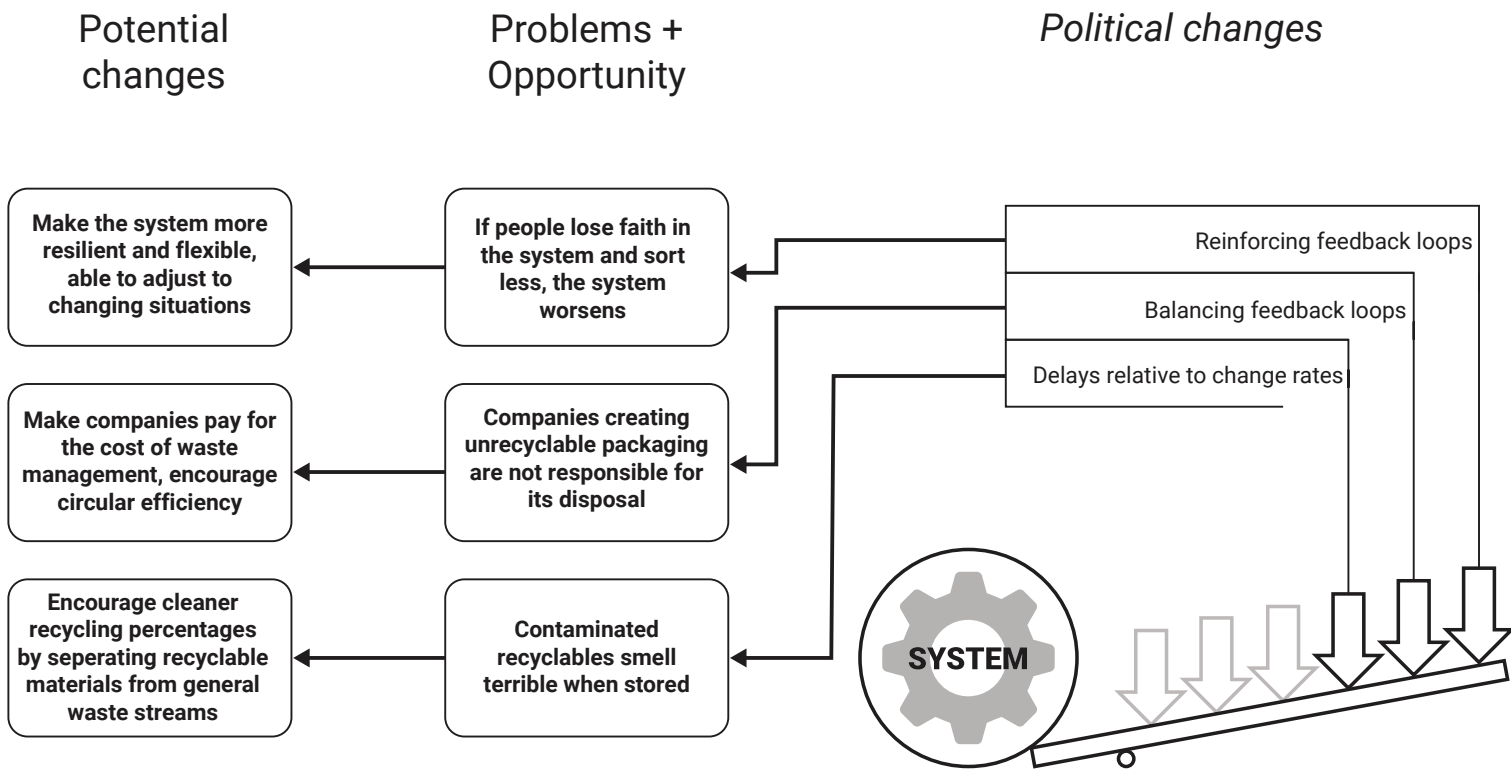


The focus as-is

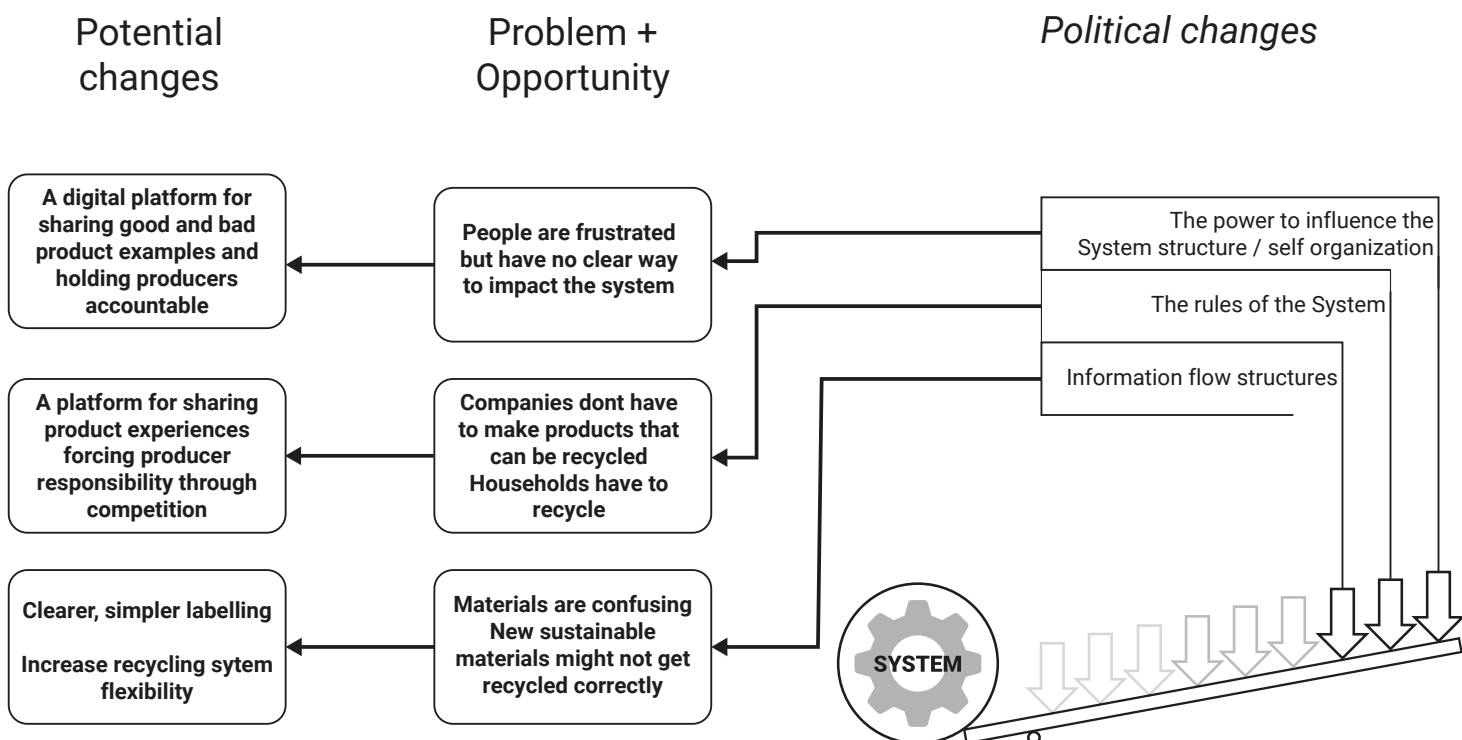
The goal that REG and Grønt Punkt approached us with the intention of working at can be seen to be at the lowest leverage point order of Donella Meadows Systems Intervention Leverage points hierarchy.

Their proposed solution may succeed in part, but the systems that surround it are unlikely to be impacted in any significant way.

Feedbacks and behavior - Interactions between elements in the system



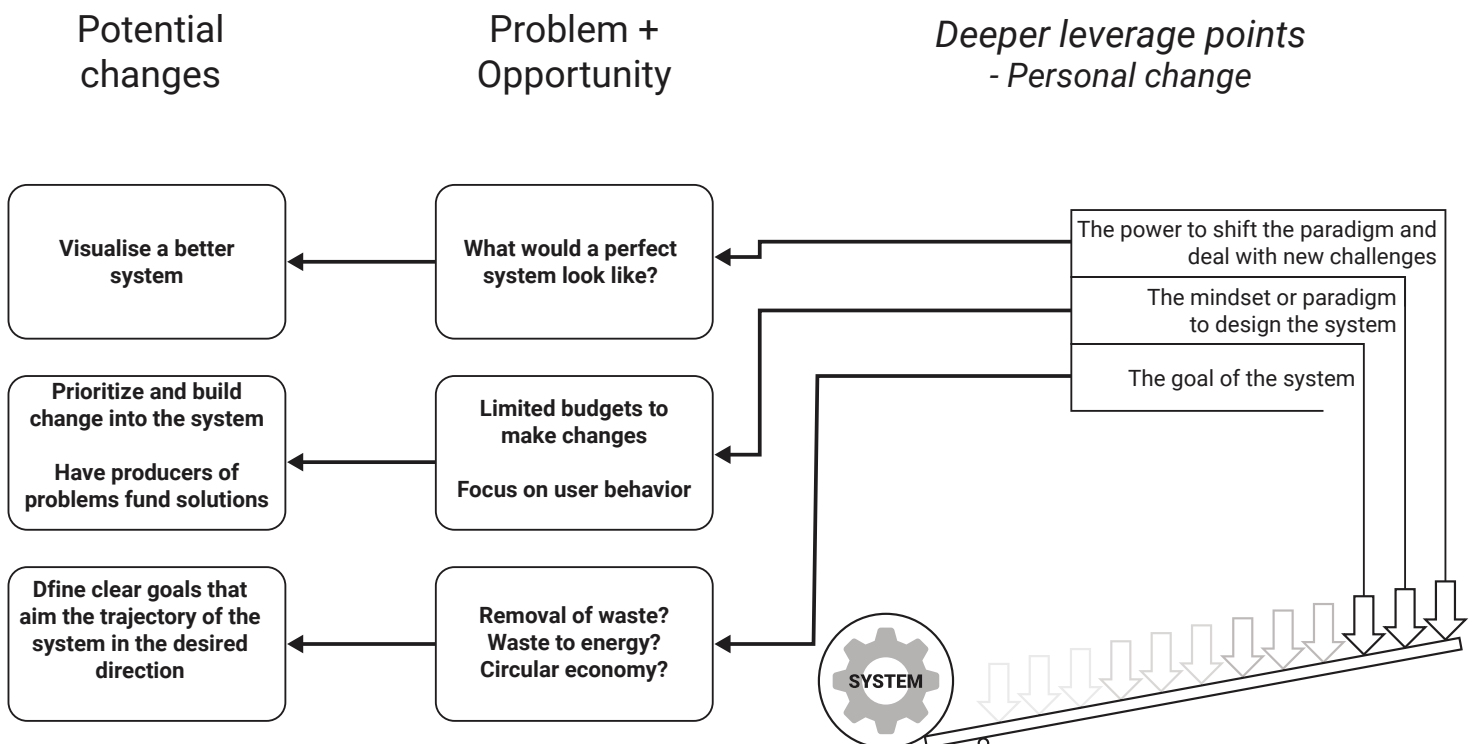
Design and structure - Social structures that manage the Feedbacks and Parameters



Working on deeper leverage points demands greater understanding of the system

Here are some of the different possible areas that can be explored in working to alter the system. We decided to try to empower people to push for the future system that they want to live in. We created a feedback system that connects users to producers and recyclers, sharing insight in a mutually beneficial feedback loop. We hope that the goals of the platform can align with those of the different actors in the system and circumvent some of the limitations that we observed, such as lack of accountability for producers and limited budgets in REG.

Intent, why? - Values, goals and world systems that shape the system



9.5 SYSTEM

Plastic, food and paper are the most confusing materials to sort



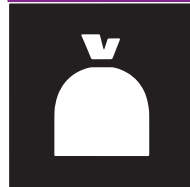
Paper



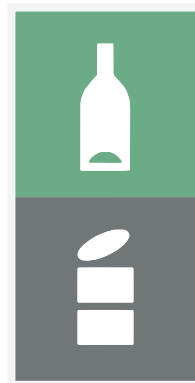
Food waste



Plastic



Mixed waste



Glass

Metal



Electricals

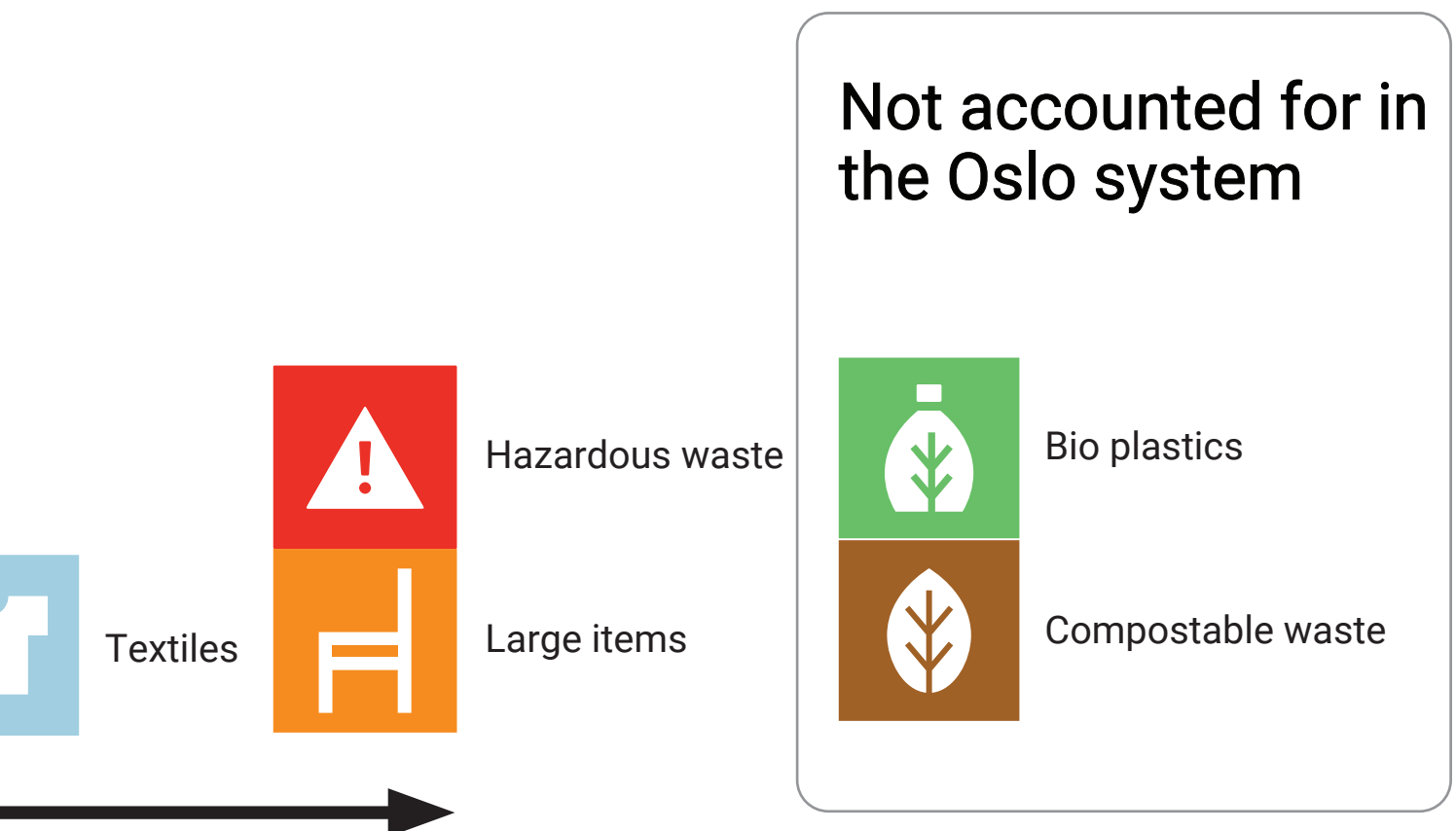
Bottle pant



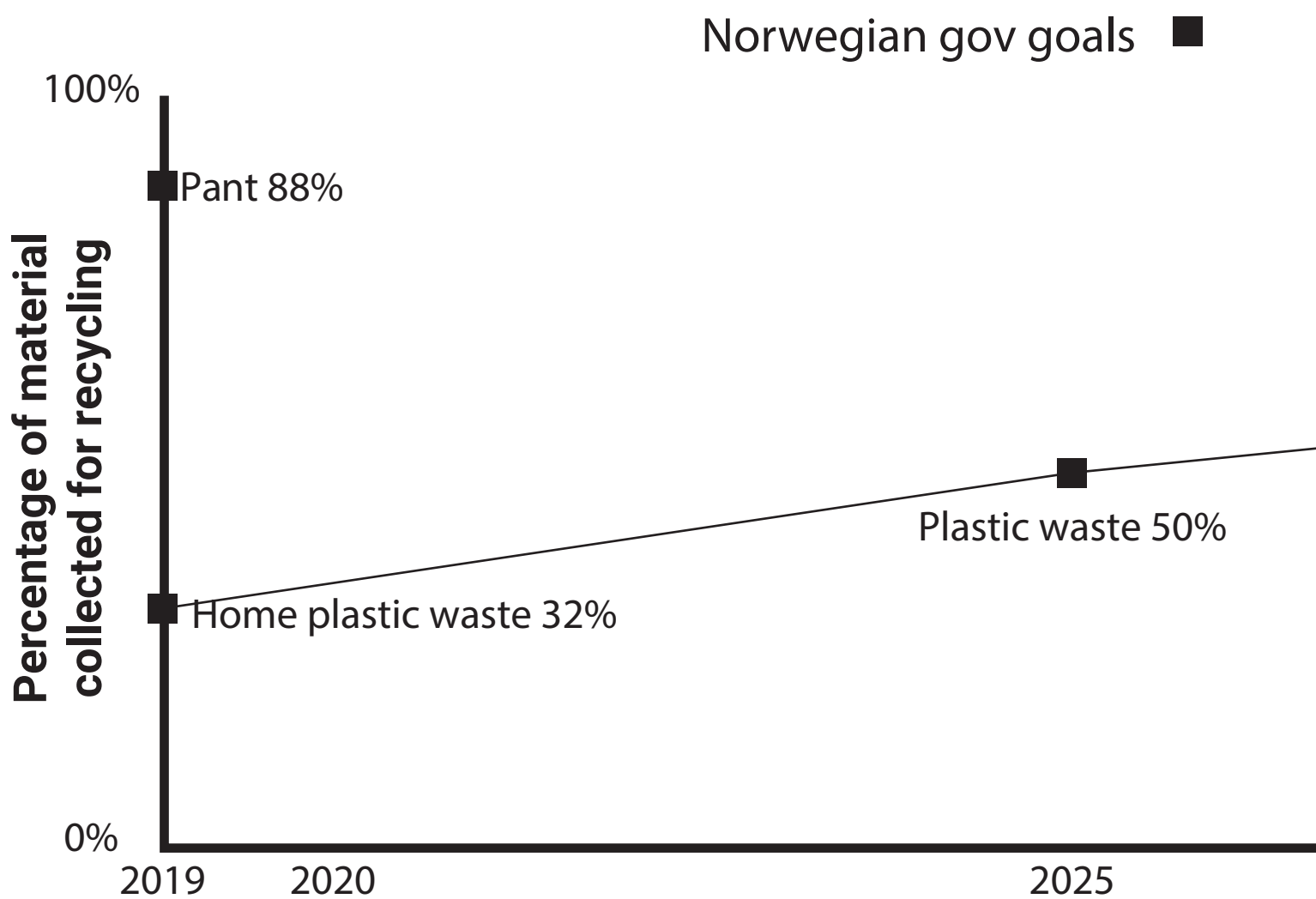
Distance from house

ARCHITECTURE

In the book 'Nudge' Richard Thaler calls those that design a system 'choice architects'. That is the role that REN has in the recycling system in Oslo (Richard H. Thaler, 2009). They are responsible for making a system that works for and benefits the people using it. Currently the emphasis at REN and Grønt Punkt is on creating better recyclers. The system as it looks now consists of individual households manually sorting their recycling into 11 different categories. The system is mandatory and the places that materials are collected are spread out, the longer the distance the more friction there is in the system.

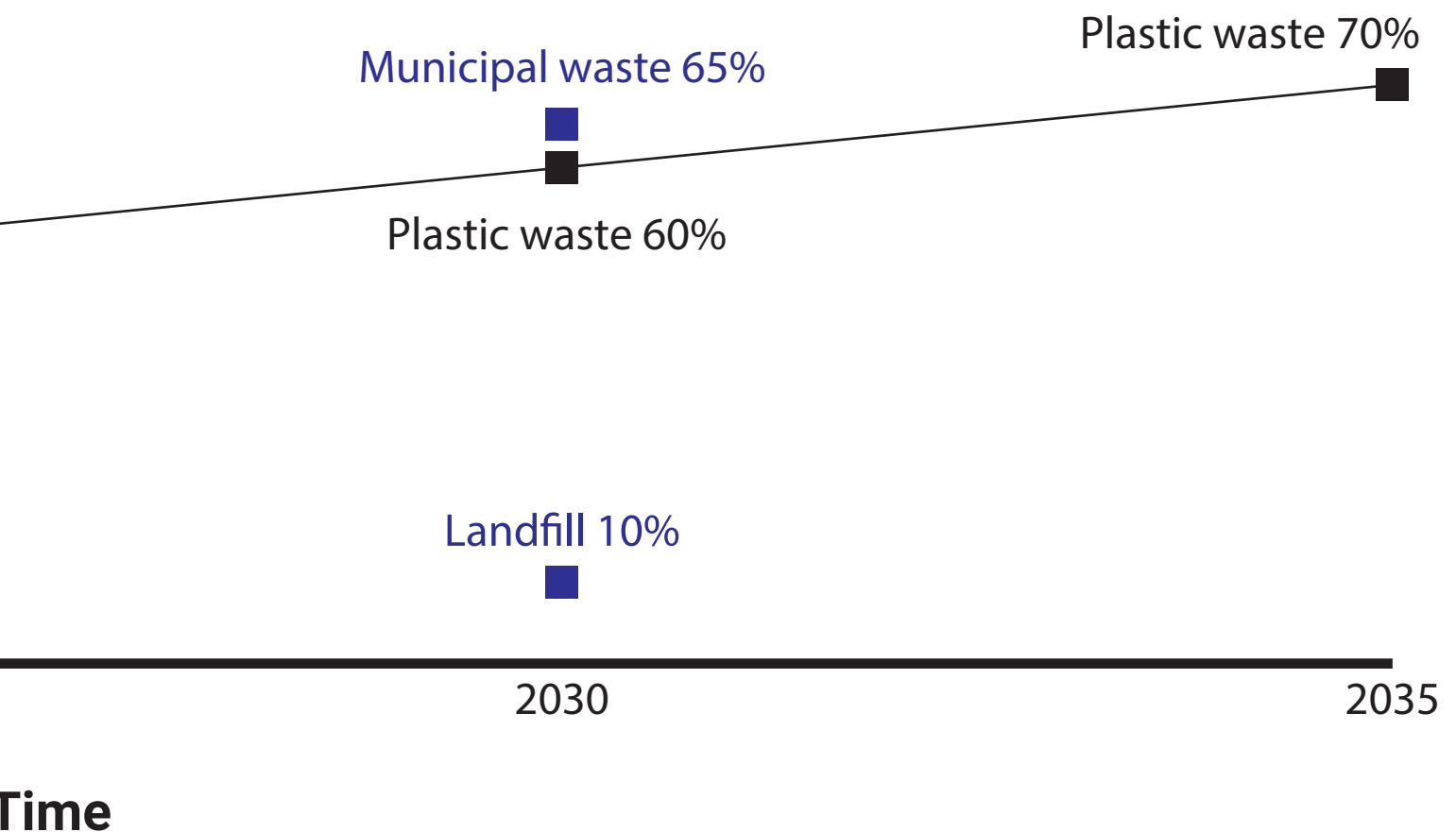


9.6 POLICY GOALS



We began mapping out the various goals that are being aimed for by different organisations. There is a big push for change, but we were curious about how much actually gets done and how much is hot air aimed to generate publicity. We ended up including a feature in our platform that would keep track of promises and hold producers accountable, so that there would be a negative cost associated with greenwashing. This doesn't scale onto government or trans-national goals as well so we dropped it.

EU goals ■



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